SUPERPAVE: OVERVIEW AND IMPLEMENTATION BY THE UNITED STATES NAVY

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Abstract

Superpave mix designs have been installed in this country for less than a decade, but have shown promising results thus far. The system provides for design with greater symmetry to the actual loading and aging of asphalt pavements. Although the new mix design utilizes the same materials as the old mix design, the resulting specification requirements are much tighter. While there have been some problems with the installation of the newly designed asphalt mixtures, these problems have been overcome by a good quality control program and close monitoring of the installation process. An asphalt pavement installed under the Superpave system carries with it a requirement for additional training of personnel that the agencies must provide. The United States Navy has a large Current Plant Value of asphalt pavements and could benefit greatly from technology that increases the life span of their facilities.

Table of Contents

List of Figures

List of Tables

Introduction

The Egyptians built roads three thousand years ago and they are still in use today. The Romans built roads two thousand years ago and they are still in use today. We built roads one hundred years ago and they have been replaced several times. Of course our roads aren't made of stone, they aren't five to ten feet thick, and they aren't limited to the loads that can be placed on them by an oxcart. Highways in the United States today have to be designed to take the pounding of millions of loadings, imposed by trucks weighing 80,000 pounds or more.

The ever increasing loading of our highways is causing premature failure of the road surface. In order to combat the higher usage rates and increasing weights being placed on our highways, we must improve our method of designing our roadways. A partial solution to this problem may be right around the corner with the implementation of Superpave. Superpave is a new mixture design system that changes the way in which we specify the characteristics of materials used in the asphalt mix, and the quantities in which they are combined. Superpave has displayed some problems, as does any new technology, but it has also displayed some very positive results.

History

In 1987 the Congress of the United States established the Strategic Highway Research Program (SHRP) with funding of 150 million dollars for five years *(1)*. The purpose of the program was to create a new system by which to build the nations highways. There was much discussion at the onset of SHRP as to what issues needed to be resolved in the hot mix asphalt industry.

The program was split into two main portions. SHRP spent five years and 50 million dollars investigating new tests and specifications for asphalt binders and to relate the laboratory analysis with actual field performance *(2)*. The rest of the funds dedicated to SHRP were concerned with the development of other ways to improve the nations roadways.

Superpave, which stands for SUperior PERforming asphalt PAVEments, was introduced to the public in 1992 *(1)*. The Federal Highway Administration became the lead agency of the Superpave program near the end of SHRP *(2)*. The last seven years have shown increased research into the program and numerous test pavements put into place.

The problems that Superpave is meant to overcome are not new. They are the same problems that have always faced the asphalt industry. The problem is to make a pavement strong enough to resist permanent deformation, yet fluid enough to resist low temperature cracking and fatigue cracking *(3)*.

Testing

There are no material changes in the Superpave system. Superpave uses all of the same basic components that standard asphalt mixture's use. The change is in how the materials are specified and how they are tested. Asphalt pavements typically fail in certain stages of a pavement's life and at certain temperatures *(3)*. Due to the predictability of pavement failure, tests could be devised that would simulate the real world environment. Under Superpave, the testing of the materials are done at temperatures and aging conditions that more realistically represent the conditions encountered by pavements in the real world *(4)*. There are three basic elements to the Superpave system *(5)*.

- Specification of the asphalt binder utilizing a performance grading system
- Mix design based on a volumetric method and analysis of the design
- Analysis tests of the mix and a performance prediction model that includes climate, environment, performance models and computer software. This portion is still in development.

The performance grading system for the asphalt binder is very different than the current system being utilized throughout the majority of the asphalt industry, the Marshall mix design. Both of the design methods include a determination of the properties of the binder at a high temperature. At high temperatures and under sustained loads asphalt mixes behave in a plastic manner and tend to flow, which may result in the formation of ruts in the highway surface. The conventional mix design parameters for binders are determined through viscosity and penetration tests completed at specified temperatures *(3)*. The viscosity tests are performed at 60^{0}C (140^0 F) and 135^{0}C (275^0 F), while the penetration test is performed at 25^{0}C (77^0 F). These tests do not allow for evaluation of the binder at low temperatures. At low temperatures or under impact loading the asphalt mixture is less viscous and more likely to rebound when loaded. However, the mixture is also more brittle in this condition and more likely to crack. The standard higher temperature tests may result in similar classification of binders that actually have different properties at lower temperatures. Figure 1 shows an example of three binders tested under the Marshall methods. Note that all three have similar resistance to penetration at 25^{0}C, similar

viscosity at 60^0C, and reach the minimum viscosity requirements at 135^0C. These three binders would all share the same grading under the Marshall method, but they are in fact different in their behavior. The second problem with the Marshall testing methods is that they do not take into account the long term aging of the asphalt. Asphalt ages due to the volatilization of light oils and oxidation. Over time asphalt oxidizes and becomes more brittle. Short term aging is generally used to describe the volatilization and oxidation that occurs during the

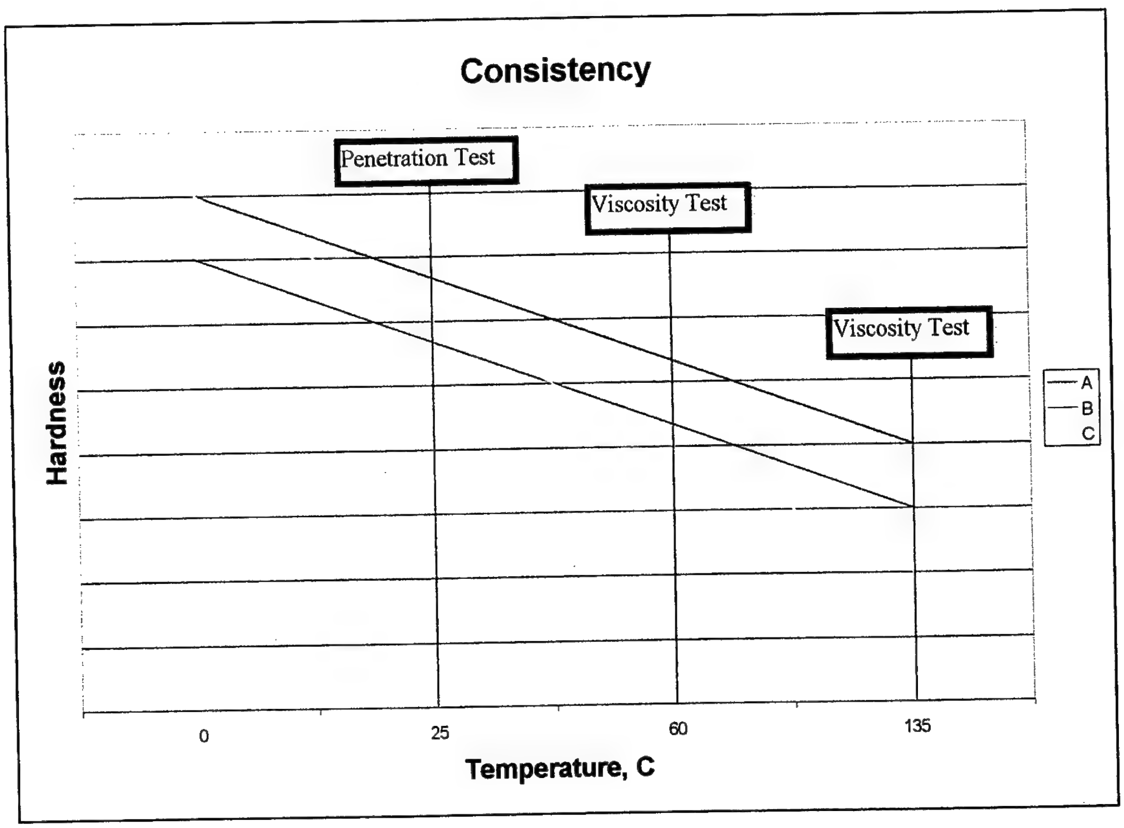


Figure 1

mixing and production process when the asphalt is hot and exists in thin layers covering the aggregate. Long term aging is generally used to refer to the oxidation that occurs after the asphalt has been placed and compacted. The voids in the asphalt allow the oxidation to continue.

The new system is designed to take into account the effects of aging and also to simulate the temperatures the pavement will experience after being placed. Table 1 shows the Superpave binder test devices, their purpose and whether the material has been aged *(6)*.

Superpave Tests		
Procedure	**Purpose**	**Performed on**
▪ Dynamic Shear Rheometer	Measure Properties at high and intermediate temperatures	▪ Original Binder ▪ Binder aged in the Rolling Thin Film Oven ▪ Binder aged in the Pressure Aging Vessel
▪ Rotational Viscometer	Measure properties at high temperatures	▪ Original Binder
▪ Bending Beam Rheometer ▪ Direct Tension Tester	Measure properties at low temperatures	▪ Binder aged in the Pressure Aging Vessel
▪ Rolling Thin Film Oven	Simulate hardening during Production	▪ Original Binder
▪ Pressure Aging Vessel	Simulate long term oxidation	▪ Binder aged in the RTFO

Table 1

The Dynamic Shear Rheometer has been used for years in the plastics industry and can be used to test the behavior of asphalt as a function of both time and temperature. This test will measure the complex shear modulus (G^*) and the phase angle (δ) at high temperatures. Figure 2 shows a simplified view of a Dynamic Shear Rheometer. The asphalt is placed between the oscillating upper plate and the fixed lower plate. By applying an oscillating torque to the upper plate the rotation of the plate can be measured. A stiffer asphalt will result in less rotation. The values of G^* and δ vary greatly with temperature and the

Dynamic Shear Rheometer

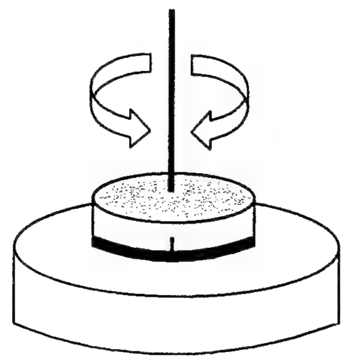


Figure 2

Viscoı Viscous vs. Elastic Binder Portion

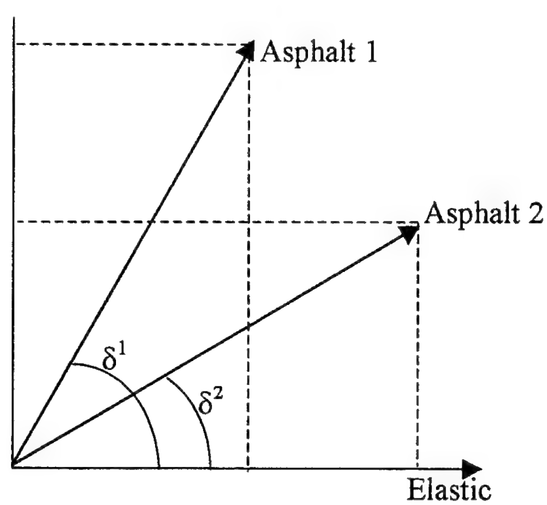


Figure 3

frequency of loading *(2)*. G* is a measure of the asphalt's stiffness, while δ is an indication of the relative amounts of recoverable and non-recoverable response of the asphalt. Figure 3 shows a graph with the Y axis labeled as the viscous portion of the asphalt, which is how the material would react at extremely high temperatures. The X axis is labeled as the Elastic portion of the asphalt, which is how the material would react at extremely low temperatures. There are two arrows shown on the graph, both of equal length, labeled as asphalts 1 and 2. The length of the arrow is an indication of the value of G*, while the angle of the arrow from the horizontal is the value of δ. Since asphalt 1 has a steeper pitch, it has a greater δ, thus its response is less elastic and more viscous. Asphalt 1 will be more likely to rut than asphalt 2 even though they have the same shear modulus, G*.

Superpave defines a rutting parameter G*/Sinδ, which represents the viscous portion of the asphalt at high temperatures. Let's assume that the Viscous portion of Asphalt 1 is equal to 4, and the Elastic portion of

Asphalt 1 is equal to 3. This results in a G^* of 5 and a $\sin\delta$ of 4/5. The resultant $G^*/\sin\delta$ is then 6.25. If we were to assume that the Viscous portion of Asphalt 2 is 3 and the elastic portion is 4, the G^* would still be 5, but the $\sin\delta$ would now be 3/5. The resultant $G^*/\sin\delta$ is now 8.33, so it becomes clear that although the two materials have the same shear modulus, Asphalt 2 has a better ability to resist rutting.

After aging the asphalt, specimens are again tested with the Dynamic Shear Rheometer and G^* and $\sin\delta$ are determined again, with the results being used to determine the fatigue cracking parameter. In this situation the parameter is determined by multiplying the two factors together, $G^*\sin\delta$. Looking back at Figure 3 shows that the fatigue cracking parameter for Asphalt 1 would be 4, while the value for Asphalt 2 would be 3. Mathematically the value of the fatigue cracking parameter for any material will always be equal to the viscous portion. However, the smaller the value, the greater the asphalts ability to flex and recover, thus in this situation Asphalt 2 shows an indication to have a

greater ability to resist fatigue cracking than Asphalt 1.

The Rotational Viscometer is used to determine the flow characteristics of asphalt binders at high temperatures. This test is used more to ascertain that the material can be pumped and handled while in the manufacturing process. A material which requires special handling would raise the price to the point of being useless. Since the Rotational Viscometer test is only to determine the ability to handle the material it is only performed on asphalt which has not been aged.

The Bending Beam Rheometer is used to measure stiffness and creep of asphalt at the lowest temperature to which the pavement can expect to be subjected. A beam of asphalt is supported at the ends and loaded in the middle with a constant load for four minutes *(2)*. The deflection of the beam is continuously measured throughout the four minute test and the creep stiffness and creep rate can be measured and calculated. The creep stiffness has been related to how brittle the asphalt is and asphalt with high creep stiffness is more likely to

crack. Higher creep stiffness will result in higher stress development during a given thermal cooling cycle. The creep rate is an indication of how quickly the stiffness of the material changes. A material with high creep rate will also have a quick change in stiffness and a corresponding ability to shed internal stresses that build up due to change in temperature. Therefore, a high creep rate is desirable.

While creep stiffness is an indication of the asphalts ability to relieve thermal stress, it does not provide direct measurement of the brittleness of the asphalt. Therefore, SHRP also developed the Direct Tension Tester. In this test a dog bone

Direct Tension Tester Sample

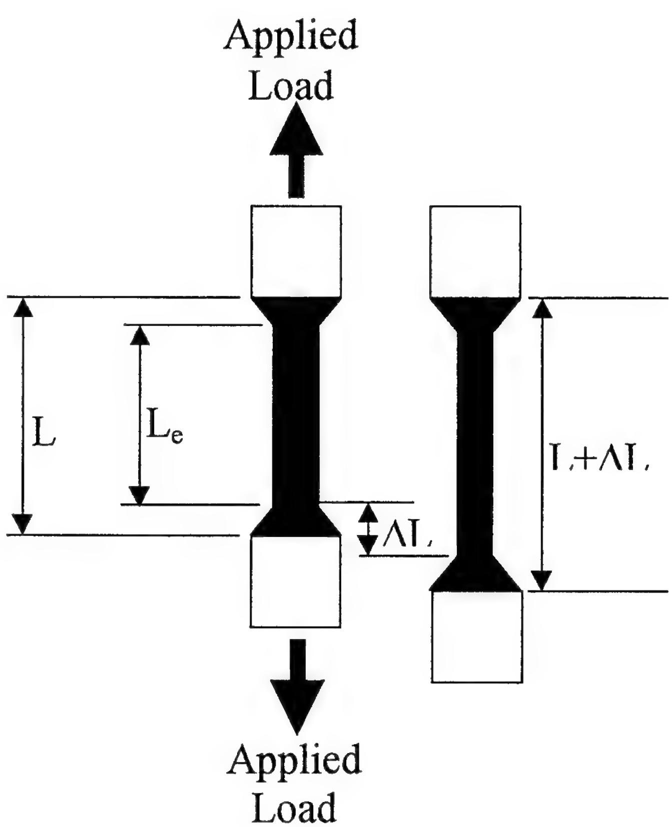


Figure 4

shaped sample (see Figure 4) is loaded in tension at a slow constant rate until failure. The elongation at failure is then used to determine the strain at failure, which is in turn an indication of whether the asphalt is brittle or ductile. The test is normally conducted between 0^0C (32^0 F) and -36^0C (-33^0 F) after being aged in both the Rolling Thin Film Oven and the Pressure Aging Vessel to represent age-hardening of a material that has been in place for several years. The failure strain (ε_f) is defined as the change in length of the sample (ΔL) divided by the original sample length, or effective gauge length (L_e):

$$\text{Failure strain}(\varepsilon_f) = \frac{\text{Change in length } (\Delta L)}{\text{Effective gauge length } (L_e)}$$

Failure is not necessarily the point at which the sample breaks. Rather, it is the point of maximum loading. The definition of failure stress (σ_f) is the failure load divided by the original cross sectional area *(2)*. It is important to realize that the stress-strain relationship of asphalt varies with temperature.

The Rolling Thin Film Oven simulates the immediate aging that in occurs in the asphalt during production (mixing and laydown), this device has been used for many

years. The constant exposure of the asphalt to air and the elevated temperatures ensure that the material loses the volatile portion and that it can oxidize. After being aged the material can be utilized for further testing using the methods described above. The Pressure Aging Vessel has been added to the testing methods under Superpave and utilizing temperature and pressure it simulates the long term aging, that occurs in service, during a 20 hour test. The material placed in the Pressure Aging Vessel should already have been through the Rolling Thin Film Oven. After being removed from the Pressure Aging Vessel the material can be tested by the methods described above. In this series of tests the results will be indicative of pavement that has been in place for many years.

Under the Superpave system there are three devices utilized to predict the behavior of the binder in the pavement, they are the Dynamic Shear Rheometer, the Bending Beam Rheometer, and the Direct Tension Tester. These three devices are meant to obtain parameters that relate to the performance of the binder under actual traffic loading *(4)* and low temperature exposure.

The Binder is then classified according to two temperatures; the highest temperature and the lowest temperature at which the binder can be expected to perform satisfactorily *(7)*. As an example, if the highest pavement temperature expected for seven days is 52^0 C (126^0 F) and the lowest expected air temperature for one day is -16^0 C (3^0 F) then the required binder classification would be PG 52-16. A binder with this classification is determined to comply with all of the physical characteristic requirements at all temperatures between and including both temperature extremes.

The low temperature extreme is estimated at the pavement surface, while the high temperature extreme is estimated at a point 20mm below the pavement surface *(4)*. In order to achieve the required characteristics over a large temperature range it may be necessary to add modifiers to the binder. Modified binders will often require mixing at higher temperatures and result in an asphalt mix that is harder to work but stiffer and more durable *(7)*. It should be noted at this time that modifiers are not new, many asphalt designs already call for the use of these modifiers under the more established Marshall design method.

Mix Design

Mix design under the Superpave system, determines the appropriate amount of asphalt and aggregate based on volumetric proportioning and compaction of trial mixes using the Superpave gyratory compactor in the laboratory. The effect of traffic loading on the asphalt pavement is simulated by the gyratory compactor, which produces test specimens. The specimens are used to determine the necessary volumetric properties including air voids, voids in the mineral aggregate, and voids filled with asphalt. These properties, as measured in the laboratory, are used to determine how the mix will perform in actual usage.

The mineral aggregate in the Hot Mix Asphalt also plays a large role in how the pavement will perform. Aggregate comes from natural and processed sources. A natural source would be gravel mined from river beds or glacial deposits. This material tends to be more rounded due to aging. Processed aggregate is generally from a quarry operation that includes crushing and sizing of the aggregate. This material will tend to have a greater number of edges, or be more angular. Other sources of

aggregate are blast furnace slag, reclaimed asphalt, shredded tires, or crushed glass.

The shear strength of the asphalt mixture comes primarily from the aggregate; the binder is merely the glue to hold it all together and to provide tensile strength. Aggregate with a higher number of edges will tend to lock together better than aggregate that is more rounded. This can be observed by merely looking at stockpiles of differing materials. A stockpile of aggregate that is more cubical will have steeper sides than one of aggregate that is more rounded. The slope of the pile is the angle of repose. The greater the angle of repose, the greater the aggregates ability to lock together. This locking together than has a direct impact on the shear strength of the mix.

The shear strength of the mix can be explained using Mohr-Coulomb theory, see figure 5 *(3)*. As load is applied to a mass of aggregate the normal stress (σ) on one plane goes up resulting in a corresponding increase in shear stress (τ). Shear failure occurs when the shear stress exceeds the shear strength, which is defined by the Mohr-Coulomb failure envelope. The angle of internal

friction (ϕ) describes the increase in shear strength relative to the normal stress on the failure plane (i. e. the confining stress). The greater the angle the greater the ability of the aggregate to lock together. At higher confining stresses the particles lock together more tightly, increasing the ability of the mix to take a load.

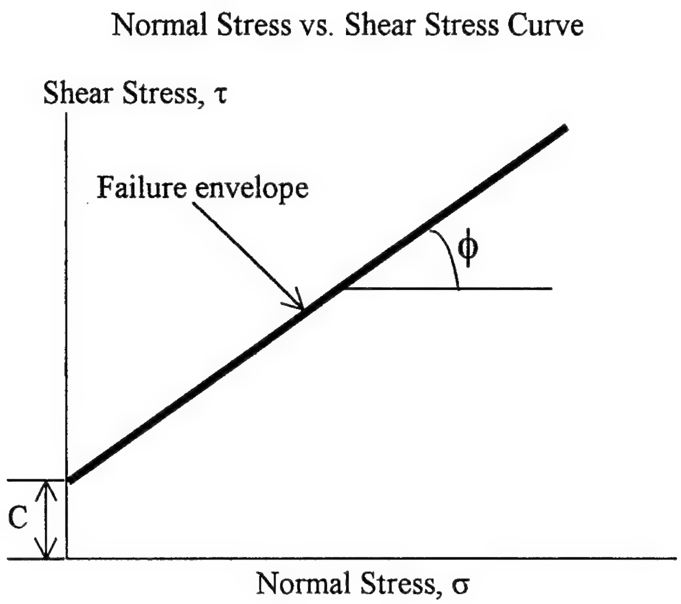


Figure 5

Superpave mix design incorporates requirements for aggregate angularity and gradation in an attempt to provide a mix design with a high level of internal friction. This high level of internal friction will provide a strong shear strength *(4)*. More recent tests, however, have indicated that there is no correlation between the Fine Aggregate Angularity and the performance of the pavement *(2)*.

The nominal maximum size of the mix is defined as the first sieve larger than the sieve that retained ten percent of the aggregate. The maximum size of aggregate allowed in the mix is one sieve larger than the nominal aggregate size. Figure 6 shows the gradation chart, on a 0.;45 power scale, for a mix with a 12.5mm nominal aggregate size. By definition, the first sieve to have retained ten percent of the aggregate would have been the 9.5mm sieve. Since no particles may be retained on the 19mm sieve, 100% passes.

A straight line from the maximum particle size back through the origin defines the maximum density gradation,

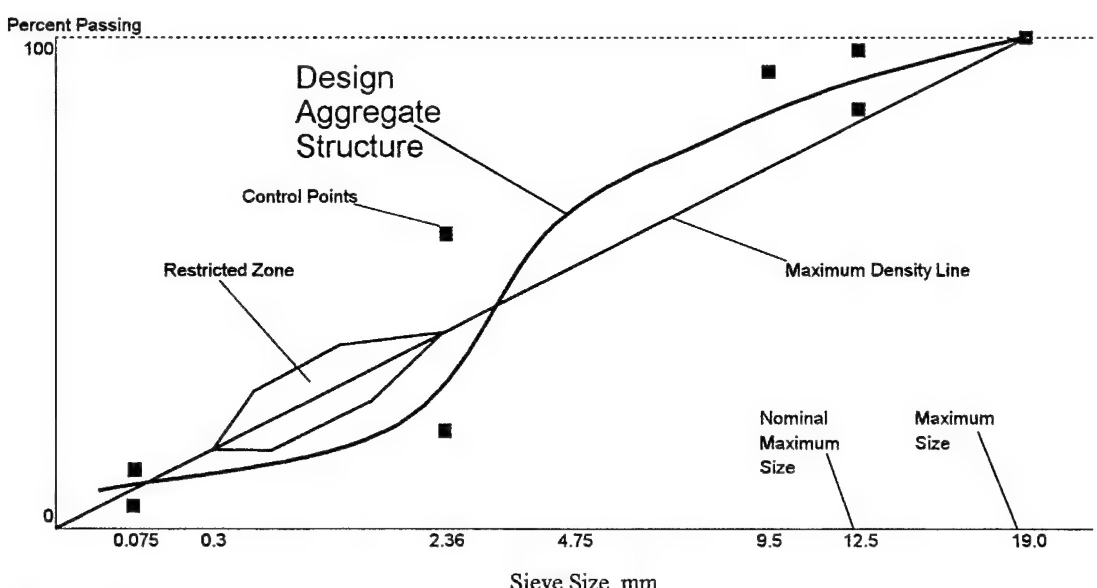


Figure 6

or the gradation that would fit the most tightly together. This is a gradation to be avoided, as it does not allow for enough voids to develop thick enough asphalt films.

Control points are added to the chart at the nominal maximum size, the intermediate size, and the dust size. In figure 6 the control points are placed at the 12.5mm, 2.36mm and 0.075mm sieve sizes. These control points create the boundary within which the gradation plot must remain. A restricted zone is also on the chart between the intermediate size and the 0.3mm size. It is recommended that the gradation curve not pass through this zone, as the resulting mix may tend to have too much sand, may be difficult to compact, and may not have a good resistance to rutting *(3)*. See Appendix A for a listing of control points and restricted zone boundaries for various nominal aggregate sizes.

The shape of the particles was also studied *(8)* and it was determined that flat aggregate, up to a ratio of 3:1, had no negative impact on the performance of Superpave. The concern regarding the shape of the particles is that if the aggregate becomes too long and

flat it will have a greater tendency to crack during construction and under traffic loading. Since Superpave allows a ratio of up to 5:1 it would not be prudent to assume that the higher ratio aggregate would also have no negative impact until such testing is completed *(8)*.

If enough voids in the mineral aggregate (VMA) and asphalt are incorporated into this mix the result should be a mix with a high level of durability. The purpose of VMA is to ensure that there is sufficient asphalt content in the mix to provide adequate durability *(9)*. However, the real reason that the durability increases is because of the asphalt film thickness in the product. One suggestion is that the minimum VMA requirement be based on the minimum required asphalt film thickness, as this will change with different gradations of aggregate in the mix. Superpave is normally, though not always, designed with a coarser mix; therefore, there is less surface area in the mix, which results in difficulty attaining the minimum voids in mineral aggregate requirement *(9)*. One recommended solution to this dilemma is to change the requirement from voids in mineral aggregate to one of asphalt film thickness. In this manner the design criteria would ensure that there is sufficient quantity

of the real durability factor, namely asphalt film thickness, and not the voids in mineral aggregate *(9)*.

One of the key features of the Superpave mix design system is the Superpave Gyratory Compactor; figure 7 is a schematic showing the key components. The gyratory compactor creates specimens for testing, but it may allow for insight into the compactability of the mix as the specimen is being made. The gyratory compactor simulates the effect of actual traffic on a pavement and aids in avoiding the use of a mix which would be likely to exhibit rutting, or densify to a point where there would no longer be enough air voids left in the pavement *(3)*.

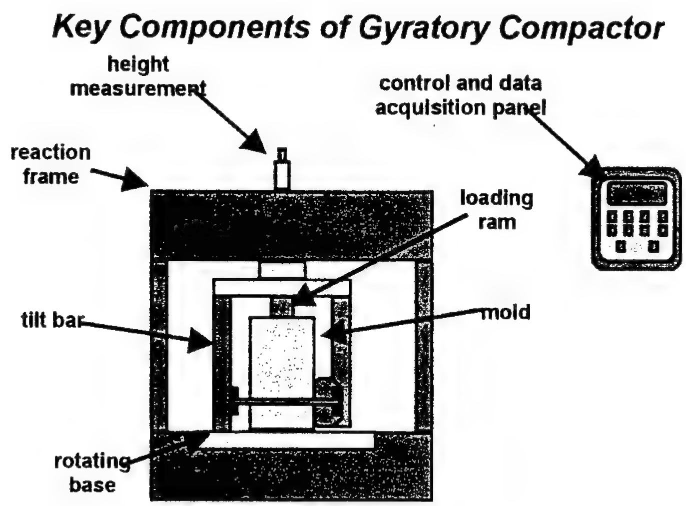


Figure 7

The compactor operates at 30 revolutions per minute and places 600 kPa of pressure on the specimen. The change in density (expressed as % of maximum specific

gravity: %Gmm) of the specimen per number of gyrations is calculated from the recorded change in specimen height during compaction and the measured bulk specific gravity of the final specimen.

Three critical points on the gyratory compactor curve are evaluated. It is important to know N_{inital} so that a mix is not used that might compact too easily. It is important to know $N_{maximum}$ to ensure that the mix will not compact excessively under traffic loading. It is important to know N_{design} because this is the desired outcome of the actual pavement and it is based on the

Three Points on SGC Curve

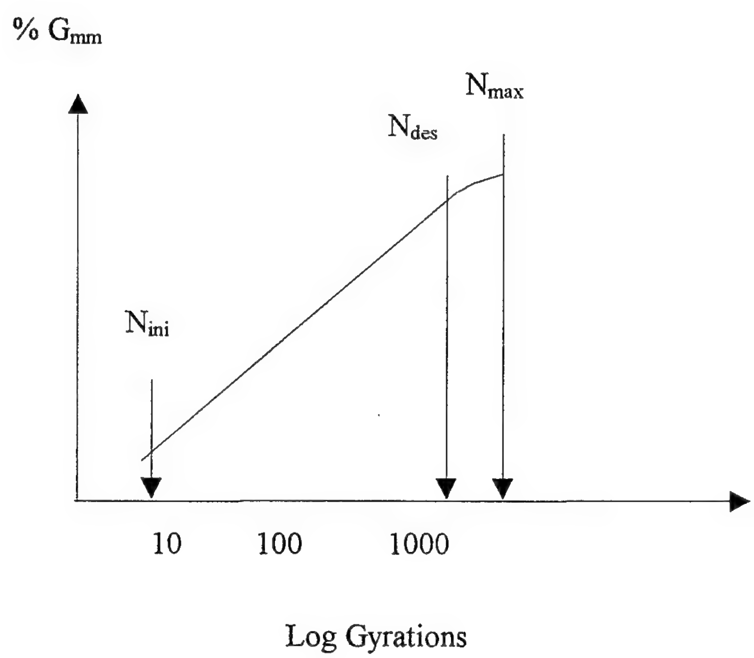


Figure 8

climate and traffic levels, see Figure 8 for a typical compaction curve. Another use of the gyratory compactor, which is portable, is to take it to the job site and use it on the delivered asphalt mixture to test for the appropriate properties as a quality control or quality assurance technique *(4)*.

Experiences in Florida

There have been many roadways paved using the Superpave design mix since its introduction in 1992. In Florida, eight projects were converted from the traditional Marshall mix design to Superpave in 1996. These projects amounted to approximately 295,000 metric tons of Superpave mix being installed, primarily in northern Florida. The reason Florida decided to go to the Superpave mix was the significant number of Interstate projects installed with the Marshall mix that failed prematurely, primarily due to rutting, in northern Florida in the recent years prior to 1996. The most significant problem encountered with the Superpave mixtures was in obtaining the appropriate density of the mix in the field.

On the first project, the contractor completed the pavement with all of the asphalt being compacted to better than 90%Gmm. Upon coring the pavement and determining the density, it was found that the air voids were actually between ten and thirteen percent. This is significantly higher than expected based on the nuclear density testing method *(10)*. During the second project it was noted that the mix compacted fine above 120^{0} C and

could be compacted slightly more after it cooled below 90^0 C, but could not be compacted between these two temperatures *(10)*. On the third project the lift size was increased and better densification was achieved.

After three projects had been completed it was noted that the pavements often wept along the shoulder, where there was a fine graded Marshall mix in place, after a rain. Upon investigation it was determined that the Superpave mix was permeable and that water was travelling through it to the Marshall mix below, and then travelling horizontally until it reached the shoulder where it would weep out. Experimentation led to the determination that the air voids in Superpave must be kept below seven percent in order to prevent excess permeability *(10)*.

A fourth project, which had been installed with thicker lifts, had little trouble reaching the specified density. Due to this discovery, the standard was changed to a lift being four times the nominal maximum aggregate size. There were no problems with weeping associated with the Superpave projects put in place in Florida in 1997. The state did make several other specifications changes for Superpave use. For example, the in place

density of Superpave must reach 94% of Gmm. If the required density is not achieved, the permeability must be below 100×10^{-5} cm/s. The minimum tensile strength must be 85% per AASHTO T-283. Air voids must be between 2% and 5% or the asphalt plant must be shut down until the problem is corrected *(10)*.

Installation Requirements

Superpave mixes react somewhat differently than standard mix designs. Because Superpave mixes normally have a coarser aggregate grading, there may be problems with segregation of materials, tender mixes, or achieving adequate density. It also becomes necessary to limit the amount of hand working of the asphalt as it is harder to move. While there are potential installation problems with Superpave, the problems are no more severe than with the Marshall method and should not deter the use of Superpave.

The potential problems begin at the plant. The coarser grading of Superpave results in a greater mass to surface area ratio that creates a potential heating and drying problem with the aggregate. Utilizing paved and sloped storage bins for aggregate stockpiles will help alleviate this problem by reducing the moisture content. Another solution is to keep the aggregate under a roof and not pull material from the bottom, but from the sunny side of the pile surface. Coarse aggregate generally has a lower moisture content than finer aggregate which will occasionally result in less effort required to dry and heat the aggregate, despite the higher mass to surface

area ratio *(7)*. Another potential concern of the aggregate is that the specifications usually will call for a higher degree of angularity within the aggregate and this may result in earlier wear of the plant equipment. Besides slightly varied storage and mixing requirements concerning time and temperature, the coarser mixes may require that slightly larger screens be used on the screen deck.

It is also important that the handling of the materials at the plant be done in a careful manner. The aggregate must be picked up and placed in the cold-feed bins, and not allowed to drop, in order to ensure the aggregate does not segregate. The transfer of materials on the conveyors is also important as the material may segregate here if there is improper alignment. The material stored in silos awaiting delivery may experience some hardening or draindown of the binder. Once the mix is ready to be delivered it must be placed in the trucks in mass quantities and not trickled into the truck, again this is to ensure the mix does not segregate. Superpave mixes have shown a tendency to cool quicker than Marshall mixes so the trucks should be covered by tarps in order to aid in retaining the heat.

The concern of segregation continues at the paver where the mix should be removed from the truck in mass and not allowed to trickle into the paver. A good way to accomplish this is to raise the truck bed slightly such that the mass is against the tailgate prior to opening the tailgate. After the material is in the paver it may be noted that the mix is more difficult to install than a Marshall mix. A few common adjustments to the paver to improve the installation process may be to change the vertical angle of the screed plate, increasing the compaction effort of the screed, or increasing the lift thickness.

Superpave mixes are often more difficult to compact than Marshall mixes. The breakdown roller should be kept immediately behind the paver to ensure good compaction. However, care must be taken that the roller does not begin to "shove" the asphalt mat. A secondary advantage of using thicker courses is that the pavement mat will retain heat longer and be easier to compact. Care must also be taken to ensure that there is adequate contact pressure between the roller and the asphalt mat. If modifiers are used in the mix, care must be taken that they do not adhere to the rubber tires of pneumatic

rollers as there will be a tendency for the tires to pickup particles from the freshly placed mat. One solution to this is to maintain an elevated temperature on the tires by placing skirts around them to keep the heat in.

The properties of Superpave that contribute to its ability to withstand rutting also make it difficult to work. For this reason the amount of hand working of the material should be minimized. The same properties could also create difficulty in obtaining a low permeability longitudinal joint.

Quality Control

The Quality Control procedures required for Superpave mixes do not change significantly from those used under the Marshall mix design, but again there are some minor variations that both the contractor and the owner should know. Because the aggregate property is taken as a whole, it is important that the blended aggregate that is to be used in the mix be tested as a whole and not individually tested from different stockpiles, just as in the Marshall mix design. A secondary concern of aggregate testing is that the aggregate may actually change properties during the mixing process. The gradation and angularity of the aggregate is important in the Superpave mix, but the mixing process may breakdown the aggregate causing an increase in fines and a rounding effect *(11)*. The design engineer during the specification process should take this breakdown of aggregate into account.

It is important that the contractor and the owner are both testing material from the same location in the production process, and that they are sure that both sets of equipment are in calibration. The normal sample size in the Superpave system is two samples, whereas under the

Marshall mix design it was common to take three samples. The reason for this variation is that the standard deviation of Superpave mix design is much lower than under the Marshall design. While the time to produce two Superpave samples is about the same as to produce three Marshall samples, the Superpave samples are much larger and require more cooling time, thus slowing down the Quality Control process. This greater delay in returning test results must be considered prior to the beginning of a Superpave project.

Binders should be tested under Superpave for conformity to design requirements. Conformance testing is a simple flow chart process where the binder is run through successive tests. The first time the binder fails a test, it is deemed to be in non-compliance with the requirements of that performance grade. See Appendix B for a flow chart of the testing process for a PG58-22 binder. In addition to testing for the required grade there are several tests which must be performed that are common to all grades of binder. The Rotational Viscosity test is run to ensure that the binder can be adequately pumped. All binders must have a flash point above 230^{0}C (446^{0}F). The mass loss must be measured after running

the Rolling Thin Film Oven to ensure that there is not too much material volatilizing *(2)*. Many local and state governments have required that the producer certify their binders, with the local Department of Transportation performing an occasional test to ensure conformity.

While the procedures of Quality Control are similar, the tests are not interchangeable. A mix designed under the Superpave method must be tested with the Superpave Gyratory Compactor and not the Automatic Marshall compactor during Quality Control procedures *(12)*. Five projects were used to test the interchangeability of the two compactors. These projects were scattered across North America. Three of the projects were designed using the Marshall method and two of the projects were designed using the Superpave method. All five projects were then tested using both compactors to see if there was any correlation between the results. The Superpave specimens were evaluated at three levels of compaction, $N_{INITIAL}$, N_{DESIGN}, and $N_{MAXIMUM}$. The Marshall mix designs were evaluated using the FHWA Office of Technology Applications Mobile Laboratory to determine if there was any variation between design and construction. Table 2 provides a summary of the design and compaction methods.

After testing for the voids in total mix it was determined that both compactors provided very similar results with the Superpave Gyratory Compactor having a lower scatter rate. If this were the only test then it would appear that the compactors are interchangeable *(12)*. However, another concern is voids in mineral aggregate and in this test the machines gave very different results due to the method of compaction. The Superpave Gyratory Compactor resulted in a lower voids in mineral aggregate content than the Marshall compactor in each test *(12)*. The primary significance resulting from the different machines is that personnel qualified to run tests on the Marshall compactor are not necessarily qualified to run tests on the Superpave compactor.

Summary of Design and Compaction Methods *(12)*				
Project Number	**Design Method**	**Compaction Effort**	**Companion Compactor**	**Compaction Effort**
539	Superpave Level I	$N_{Design}=100$ $N_{Maximum}=158$	6-in Marshall	112 blows/side
540	6-in Marshall	112 blows/side	Superpave Gyratory Compactor	$N_{Design}=100$ $N_{Maximum}=158$
641	4-in Marshall	50 blows/side	Superpave Gyratory Compactor	$N_{Design}=100$ $N_{Maximum}=158$
9401A	4-in Marshall	75 blows/side	Superpave Gyratory Compactor	$N_{Design}=100$ $N_{Maximum}=158$
9407A	Superpave Level I	$N_{Design}=86$ $N_{Maximum}=134$	4-in Marshall	50 blows/side

Table 2

The primary responsibility for Quality Control falls on the contractor. The contractor must be sampling the production of the asphalt mix on a regular basis as it comes from the plant. A requirement for contractors to have, maintain, and operate all required testing equipment should result in no additional contract cost, provided it is in a State where there are a significant number of contractors with certified technicians and Quality Control programs who have already spread the initial costs across several projects. In order to provide Quality Assurance, the owner should be taking samples and testing them on a much less frequent basis than the contractor. A major requirement for the proper placement of Superpave is the contractors ability to rapidly adapt his production to control problems which may arise. See Appendix C *(7)* for a troubleshooting chart of mixture problems specific to Superpave.

Cost Data

The cost of the materials that go into the Superpave mix design does not cost more than the materials in the Marshall mix design. This is reasonable as the same materials are utilized; they are just specified differently. It could be expected that the limitations placed on the materials by the Superpave design would result in corresponding increase in cost, but this has not happened. The cost for testing equipment runs around $25,000 for a Superpave Gyratory Compactor and between $75,000 and $100,000 for a complete lab set up. This cost has already been borne by the contractors in the majority of states, and although it created a slight temporary increase in the cost of Superpave contracts, the cost normally runs the same as the Marshall design costs, per Lee Gallivan, Materials Engineer, Indiana Office, Federal Highway Administration.

There is not yet sufficient data to say what will be the long term savings of Superpave. Indiana has been utilizing the Superpave system and has begun to track field performance on fourteen projects, seven designed with the Superpave method and seven designed with the Marshall method *(13)*. Four items were checked in the

field; the Friction, the International Roughness Index (IRI), the rut depth and the Pavement Condition Rating (PCR). Early results indicate that the friction factor and the Pavement Condition Rating are better on the Superpave projects, while the rut depth and International Roughness Index are about the same. Tables 3 and 4 *(13)* show complete data for the fourteen projects. The early indication is that the Superpave designed mixtures will last longer than the Marshall designed mixtures, but there is no conclusive proof at this time.

Superpave Design Mixes									
Contract	F/A Rte	1997							
		Friction		IRI In/mi		Rut Depth		PCR	
		Avg	SD	Avg	SD	Avg	SD	Avg	SD
21476	I-74	51	7	72	24	0.20	0.16	98	1.4
21470	I-64	37	4	73	8	0.04	0.02	98	0.5
22185	I-65	46	6	63	10	0.03	0.01	99	1.0
22340	I-74	58	8	85	17	0.15	0.12	98	0.0
22341	I-74	41	9	64	20	0.17	0.19	98	1.3
22347	I-64	51	7	44	3	0.06	0.01	98	1.0
22348	I-65	46	7	83	18	0.11	0.07	98	1.9
Avg-Superpave		47	7	69	14	0.11	0.07	98	1.0

Table 3

Marshall Design Mixtures									
Contract	F/A Rte	1997							
		Friction		IRI In/mi		Rut Depth		PCR	
		Avg	SD	Avg	SD	Avg	SD	Avg	SD
22004	I-64	47	6	78	8	0.18	0.04	98	1.2
21473	I-64	34	6	61	5	0.17	0.01	97	1.4
21607	I-65	46	4	48	4	0.07	0.03	97	1.1
21602	I-74	42	9	76	10	0.06	0.01	96	1.6
21601	I-74	45	9	80	11	0.10	0.05	95	3.9
21606	I-64	40	7	68	14	0.04	0.01	98	1.4
21881	I-65	22	2	85	4	0.05	0.01	94	2.8
Avg-Marshall		39	9	71	13	0.10	0.02	96	1.9

Table 4

Training is available at a variety of levels and costs. The National Highway Institute provides a one-day workshop for personnel in management positions. A training class at an owner's location costs approximately $2,000 plus the travel expenses of one trainer for the management workshop. An engineer level course is also available through the National Highway Institute that costs approximately $4,000 plus the travel costs of one trainer. The engineer level course runs between two and three days. There are also courses available for technicians, but there are not any courses currently available for inspectors. The National Center for

Asphalt Technology will create a training course for inspectors that would cover all aspects of asphalt installation, including Superpave projects, that would cost around $10,000 and have a class size of around 20 personnel. This course would be given on the Auburn University campus and would require that students travel there for the course. One of the benefits of the course is that it could be tailored to a specific owner, such as the Navy, and the Power Point based lecture could be taken with the students to teach other inspectors in their office. The Asphalt Institute currently has training courses available for Inspectors on asphalt projects, and these courses cost around $500 per person, or about the same as the National Center for Asphalt Technology course.

Navy Implementation

The Navy Facilities Engineering Command (NAVFAC) is responsible for the construction and maintenance of Navy and Marine Corps Shore Facilities. The senior engineer in the United States Navy gave a succinct definition of the Civil Engineer Corps purpose in his forward to the Naval Facilities Engineering Command Strategic Plan For Fiscal Years 2000-2002 "... Bases for 21st Century Naval Forces"

> "America defines its Navy with ships, planes, people and bases. Throughout history Navy bases have been built, operated, maintained, redeveloped and closed to respond to the needs of naval operations. NAVFAC Engineering Field Divisions, Activities, Centers and Offices, Navy Public Works Centers and Departments, and Naval Construction Force Seabees have served as the Navy's solid triumvirate ashore, providing our proud naval forces the operating, support and training bases they need when they are home...from the sea. Our collective challenge will be to continue to develop bases well suited for 21st century naval forces."
>
> *L. M. Smith*
> *Rear Admiral (Upper Half)*
> *Civil Engineer Corps*
> *United States Navy*
> *Chief of Civil Engineers*

In order to develop these bases for the 21st century we must continue to look for new and innovative ways to forward the worlds second oldest profession, providing access and shelter for man to conduct the day to day

business of defense. Unfortunately, the average person seldom thinks about the transportation network in this country, unless it is in a state of disrepair, and the average people in the Navy is often no different.

Superpave gives the appearance of being the newest, most innovative way, to stretch the construction and maintenance dollar that has been developed in quite some time, but is it right for the Navy? The implementation of Superpave appears to carry additional direct cost. The construction costs for Superpave are the same as for the Marshall designed asphalt mixes in those states that have had enough Superpave contracts to build a large enough contractor base. However, it has also been recognized in those states that the Superpave design requires careful monitoring and attention or it may not be installed correctly, resulting in a pavement that might last a shorter duration of time.

The Commander, Naval Facilities Engineering Command is the technical advisor to the Chief of Naval Operations for all engineering and facilities matters. With this responsibility, comes the responsibility to provide engineering aid and support to all of the shore

establishments in the Navy. The organizational structure that helps to accomplish this mission is shown in Figure 9.

Naval Facilities Engineering Command Organizational Chart

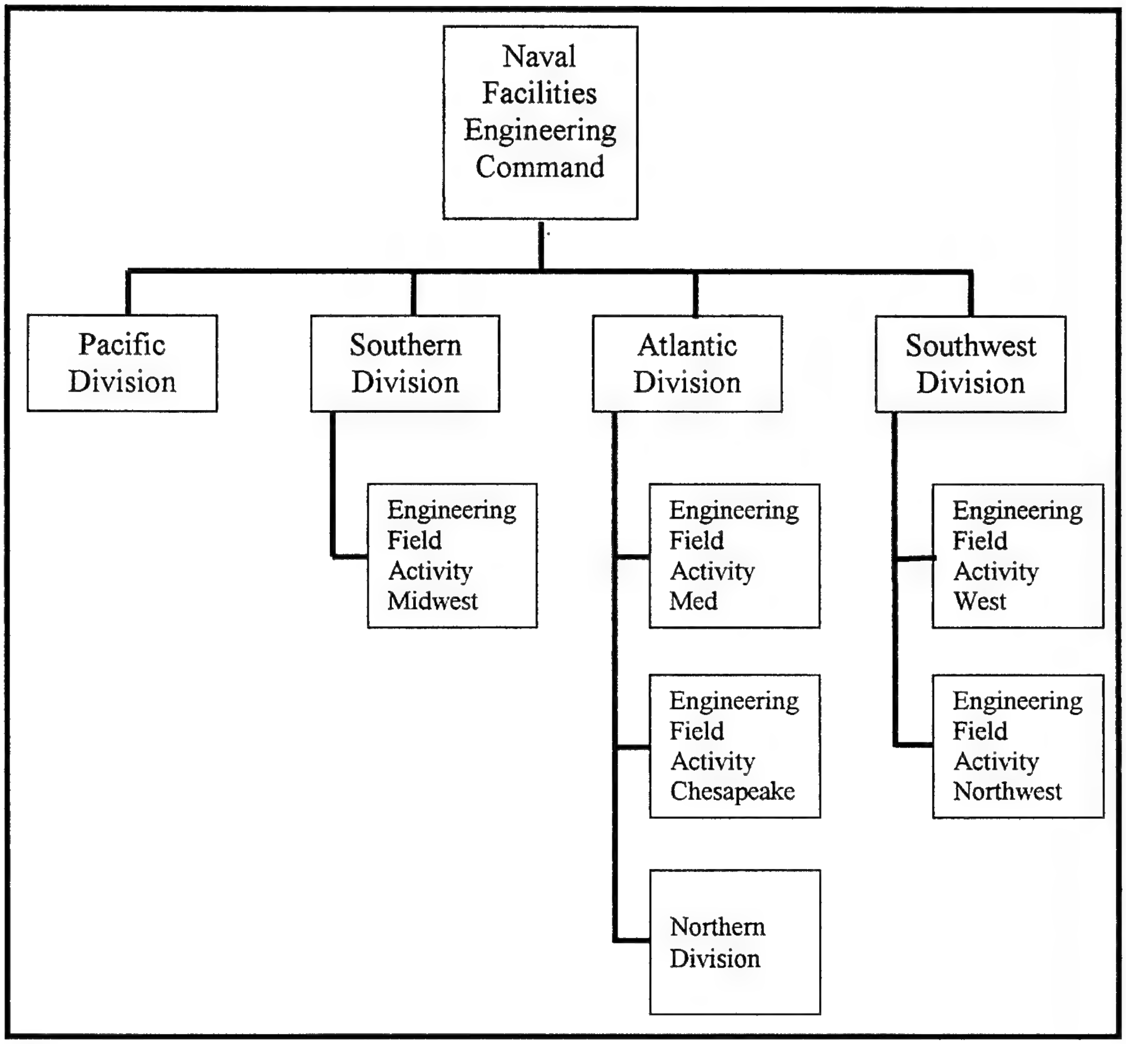


Figure 9

The Area of Responsibility for each of the Engineering Field Divisions is shown in figure 10 with the Engineering Field Activities that report to the higher Engineering Field Divisions shown in the same color with a different pattern.

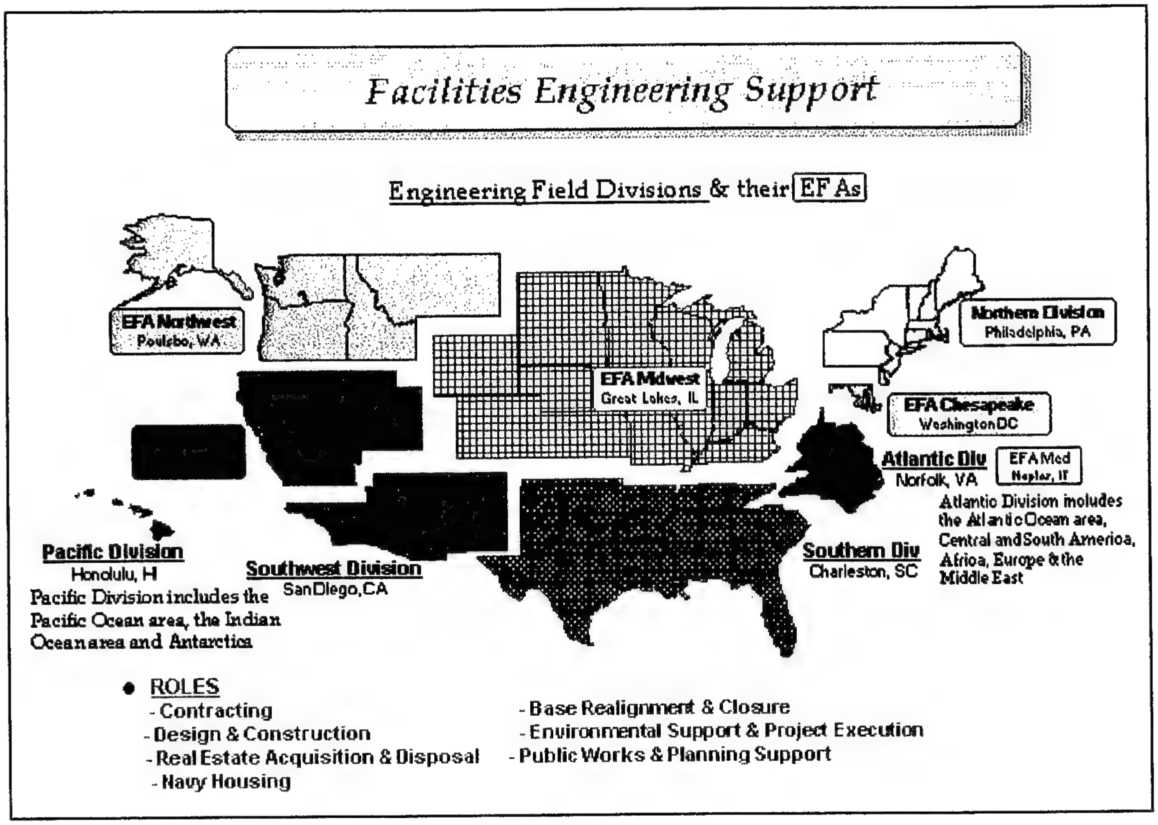


Figure 10

The Current Plant Value of the roadways owned by the Department of the Navy, which includes both the U. S. Navy and the U. S. Marine Corps, is estimated at $2,872,028,000 for those bases situated within the United States. This estimate does not include the value of roadways on bases in U. S. territories or foreign countries. It also does not include the value of roadways on Reserve Centers, or bases in caretaker status. Appendix D provides a breakdown of the value of roadways on Marine Corps and Navy bases in the different Engineering Field Division Areas of Responsibility.

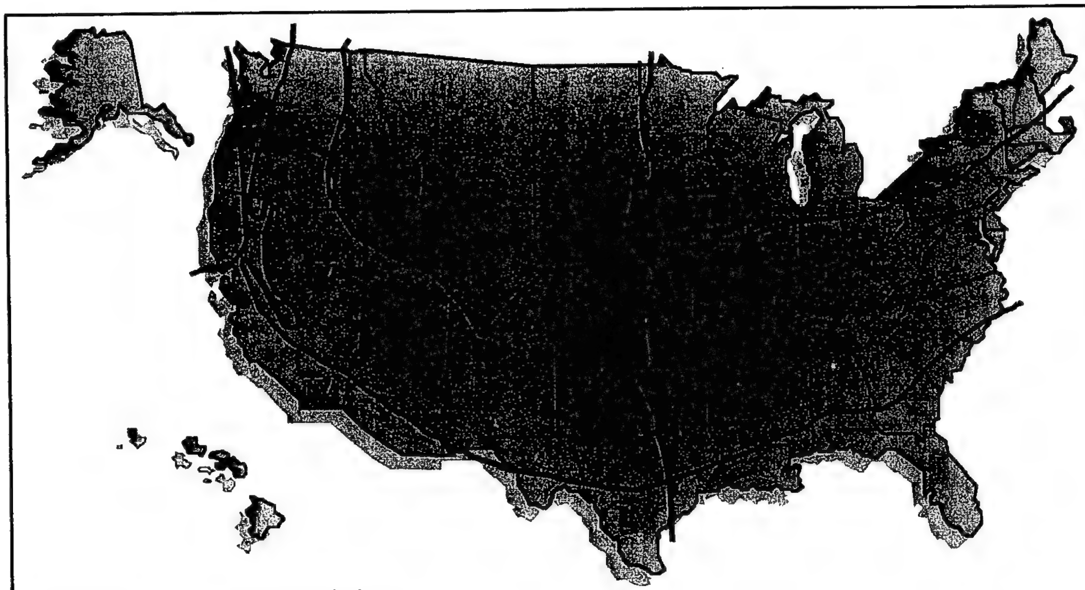
While Appendix E provides a combined breakdown of all of the roadways, Navy and Marine Corps, within each of the Engineering Field Divisions.

It should be noted at this time that the information in Appendices D-G is broken down in the same manner as provided in the NAVFAC P-164 "Detailed Inventory of Naval Shore Facilities". We can see from this breakdown that the majority of plant value is in the areas belonging to Southern Division and Southwest Division. Unfortunately, looking at figure 10 shows that the majority of the United States also falls under the responsibility of Southern Division and Southwest Division.

Appendix F provides a breakdown of the current plant value of roadways within each state. From Appendix F it can be easily discerned that the majority of the Navy's roadway assets are within eight states, California, Florida, Hawaii, Indiana, Maryland, North Carolina, Virginia, and Washington. While California is actively avoiding the use of Superpave technology, there are several states that are at the forefront of Superpave utilization, per Lee Gallivan, Materials Engineer, Indiana Office, Federal Highway Administration. States

such as Maryland, Florida, Indiana, and North Carolina are among those leading the nation in the use, testing, and advancement of Superpave. The utilization of Superpave within these states should not cost the Navy any extra construction dollars.

It can quickly be discerned from appendix G that the majority of Navy roadway assets are within environmental Regions I and II, with the single greatest concentration being in Region II. For a definition of the environmental regions see Figure 11.



Region	Characteristics
I	Wet, no freeze
II	Wet, freeze-thaw cycle
III	Wet, hard freeze, spring thaw
IV	Dry, no freeze
V	Dry, freeze-thaw cycle
VI	Dry, hard freeze, spring thaw

Figure 11

The freeze-thaw cycle is extremely hard on pavement and greatly enhances the low temperature cracking, as the pavement is constantly building and relieving stresses during the changes in temperature. The Navy could obviously benefit from a pavement design that increases a pavement's durability and longevity. Not only would the benefits of Superpave impact the Navies roadways, but a decrease in low temperature cracking would also benefit the Navy's parking lots and other paved areas, see Appendix H for a listing of other paved areas by environmental region.

The change to Superpave is not free, even in those states were there is no additional construction costs. The installation of a Superpave pavement must be closely monitored, requiring a knowledgeable inspector on site a significant portion of the time. While the Superpave testing can easily be written into the contract, as current testing by independent laboratories is often written into construction contracts, the role of the inspector can only be filled by a Navy Construction Representative. These construction representatives must be trained in the proper installation techniques of Superpave, and that will cost the Navy significant

training funds. Each Engineering Field Division and Engineering Field Activity that has an area of responsibility within the United States should receive the general engineers course in order to understand the full ramifications of what Superpave can do and how it is different. There are 9 such offices in the United States, plus one headquarters, with the cost per class at $4,000 plus travel for one trainer. Assuming an average travel cost of $1,000 per class, this sums to a total of $50,000.

There would also be a requirement to train at least one Construction Representative from each construction office, see Appendix I for a listing of construction offices within the United States. The cost of training one Construction Representative is pretty uniform across the different training venues and runs roughly $500 per person plus travel. These courses last one week and the cost of airfare, lodging, and food can be assumed to total nearly $1,500 person. From Appendix I it can easily be seen that there would be a need to train a minimum of 66 personnel. The cost to train these personnel can then be estimated at $132,000. Adding this amount to the amount for engineer and managers training

from above gives a total of $182,000. The cost of training is obviously a significant amount, especially in the face of shrinking budgets, specifically shrinking training budgets.

The training costs, however, do not need to be funded in one year. The Navy should utilize the experience and training gained by those states that lead the way in the implementation of Superpave. By utilizing Superpave mixes on Navy construction projects in states that have five years or more experience, the Navy will be able to slowly implement the use of Superpave. This allows the Navy to perform careful cost comparisons, on a state by state basis, to see if the construction costs will vary significantly in any given state. A slow implementation also allows the Navy to train Construction Representatives over several years and also build a knowledge database to be shared with construction offices as the technology spreads slowly through the administrative structure.

The implementation of Superpave throughout the Navy falls in line with the Naval Facilities Engineering Commands innovation, technology, and customer oriented

Mission, Vision, and Guiding Principles, they are as follows:

Mission

- ☞We are the Navy's facilities, installation, and contingency Engineers.
- ☞We serve the Navy and Marine Corps team, Unified Commanders, DOD and other federal agencies.
- ☞We plan and deliver innovative, technology-leveraged solutions and alternatives to meet our clients' needs.

Vision

- ☞We are an integral member of the Navy and Marine Corps team.
- ☞We are valued for our ability to offer and deliver timely and effective facilities engineering solutions.

Guiding Principles

- ☞UPHOLD Navy's core values of Honor, Courage, and Commitment
- ☞EMPOWER teams with responsibility, authority, and accountability
- ☞SHAPE resources proactively to accomplish core workload
- ☞DEDICATE ourselves to technical and service excellence
- ☞PROVIDE a safe and efficient work environment
- ☞FOSTER the professionalism of our workforce
- ☞OPERATE within an agile, global network
- ☞LISTEN to our clients and be accountable
- ☞COMMUNICATE openly and honestly
- ☞INNOVATE and improve continuously
- ☞VALUE and respect each other
- ☞PRESERVE the public trust
- ☞DELIVER expert solutions

Conclusions

Superpave is the first major innovative change to the asphalt industry in fifty years. It appears to have the potential to be the appropriate design to carry our highway pavements well into the next century. The newer mix designs take into account the varied climatic regions within which asphalt is utilized. The utilization of new testing methods and computer models not only brings the asphalt industry to the forefront of technology, but it also greatly reduces the scope within which asphalt materials and mixes must lie in order to be acceptable. Before Superpave can become the standard for the paving industry, all of the problems associated with compacting the material in the field, being able to readily test the quality of the asphalt, and the ability of the average pavement contractor to install Superpave, must be solved.

Before the Navy utilizes Superpave, each Engineering Field Division should perform an analysis on the states in their area to determine if Superpave is the optimum paving technique. In many states they may find that Superpave is more expensive than conventional asphalt designs.

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Appendix A

Superpave Asphalt Mixture Gradation Requirements

37.5mm Nominal Size

Sieve, mm	Control Points		Restricted Zone Boundary	
	Minimum	Maximum	Minimum	Maximum
50	100.0			
37.5	90.0	100.0		
25		90.0		
19				
12.5				
9.5				
4.75			34.7	34.7
2.36	15.0	41.0	23.3	27.3
1.18			15.5	21.5
0.600			11.7	15.7
0.300			10	10
0.150				
0.075	0.0	6.0		

25mm Nominal Size

Sieve, mm	Control Points		Restricted Zone Boundary	
	Minimum	Maximum	Minimum	Maximum
37.5	100.0			
25	90.0	100.0		
19		90.0		
12.5				
9.5				
4.75			39.5	39.5
2.36	19.0	45.0	26.8	30.8
1.18			18.1	24.1
0.600			13.6	17.6
0.300			11.4	11.4
0.150				
0.075	1.0	7.0		

Appendix A

Superpave Asphalt Mixture Gradation Requirements

19mm Nominal Size

	Control Points		Restricted Zone Boundary	
Sieve, mm	Minimum	Maximum	Minimum	Maximum
25	100.0			
19	90.0	100.0		
12.5		90.0		
9.5				
4.75				
2.36	23.0	49.0	34.6	34.6
1.18			22.3	28.3
0.600			16.7	20.7
0.300			13.7	13.7
0.150				
0.075	2.0	8.0		

12.5mm Nominal Size

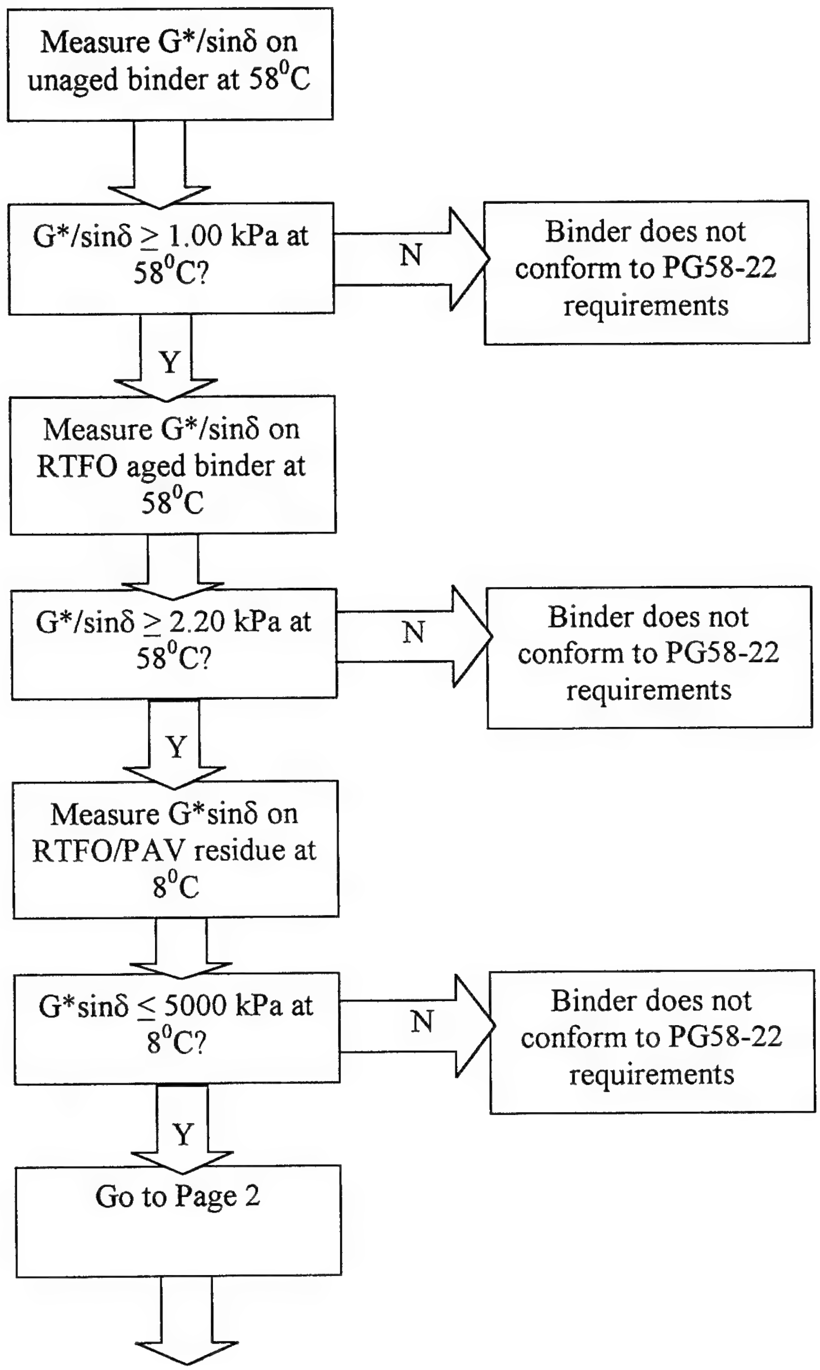
	Control Points		Restricted Zone Boundary	
Sieve, mm	Minimum	Maximum	Minimum	Maximum
19	100.0			
12.5	90.0	100.0		
9.5		90.0		
4.75				
2.36	28.0	58.0	39.1	39.1
1.18			25.6	31.6
0.600			19.1	23.1
0.300			15.5	15.5
0.150				
0.075	2.0	10.0		

9.5mm Nominal Size

	Control Points		Restricted Zone Boundary	
Sieve, mm	Minimum	Maximum	Minimum	Maximum
12.5	100.0			
9.5	90.0	100.0		
4.75		90.0		
2.36	32.0	67.0	47.2	47.2
1.18			31.6	37.6
0.600			23.5	27.5
0.300			18.7	18.7
0.150				
0.075	2.0	10.0		

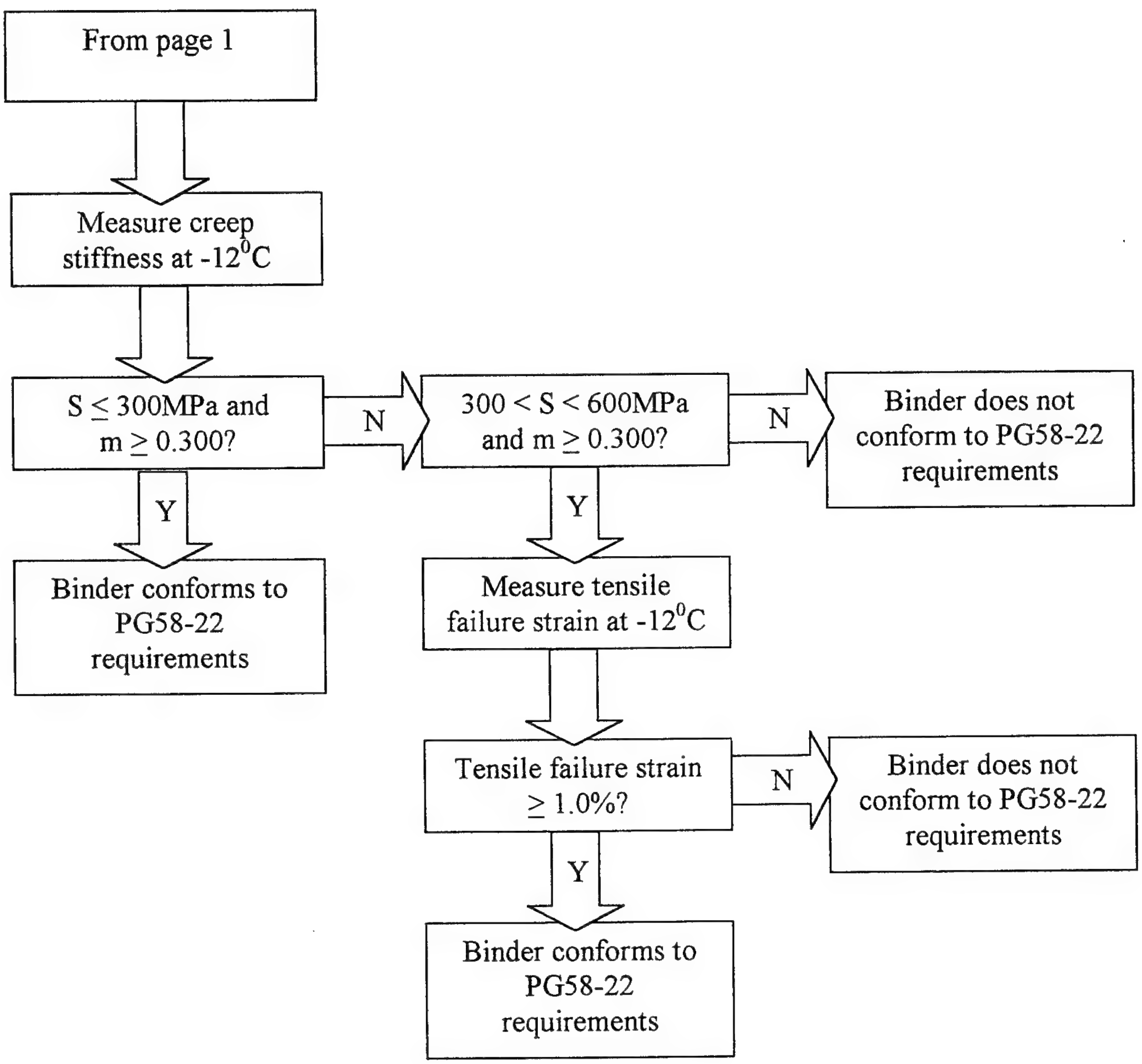
Appendix B

Conformance Testing Process for a PG58-22 Binder



Appendix B

Conformance Testing Process for a PG58-22 Binder (cont.)



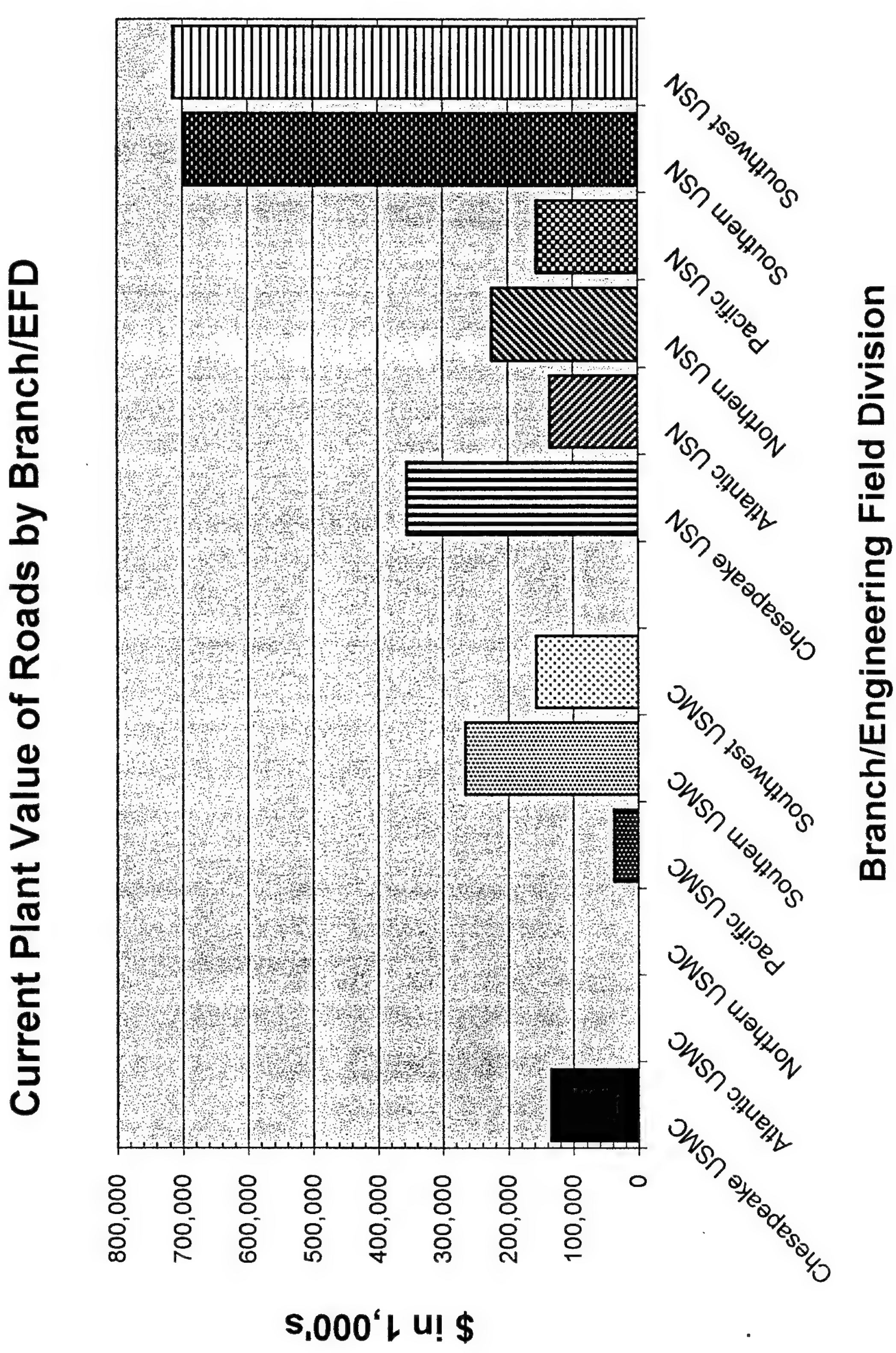
Appendix C

Chart of mixture problems specific to Superpave

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTIONS
Draindown	1. Mix temperature too high 2. Binder content too high	1. Lower temperature 2. Use stiffer binder 3. Use fiber 4. Increase filler and reduce binder content 5. Reduce binder content
In-place Permeability	1. Low density	1. Increase compactive effort 2. Avoid rolling at tender zone 3. Lift thickness to particle size 3 to 1 minimum
Lateral Movement Under Rollers	1. Tender mix	1. Avoid rolling at tender zone 2. Use rubber tire roller 3. Change roller pattern 4. Finish compaction above 250^{0}F
Poor workability	1. Coarse graded mixtures 2. Modified binders	1. Increase temperature 2. Minimize handwork

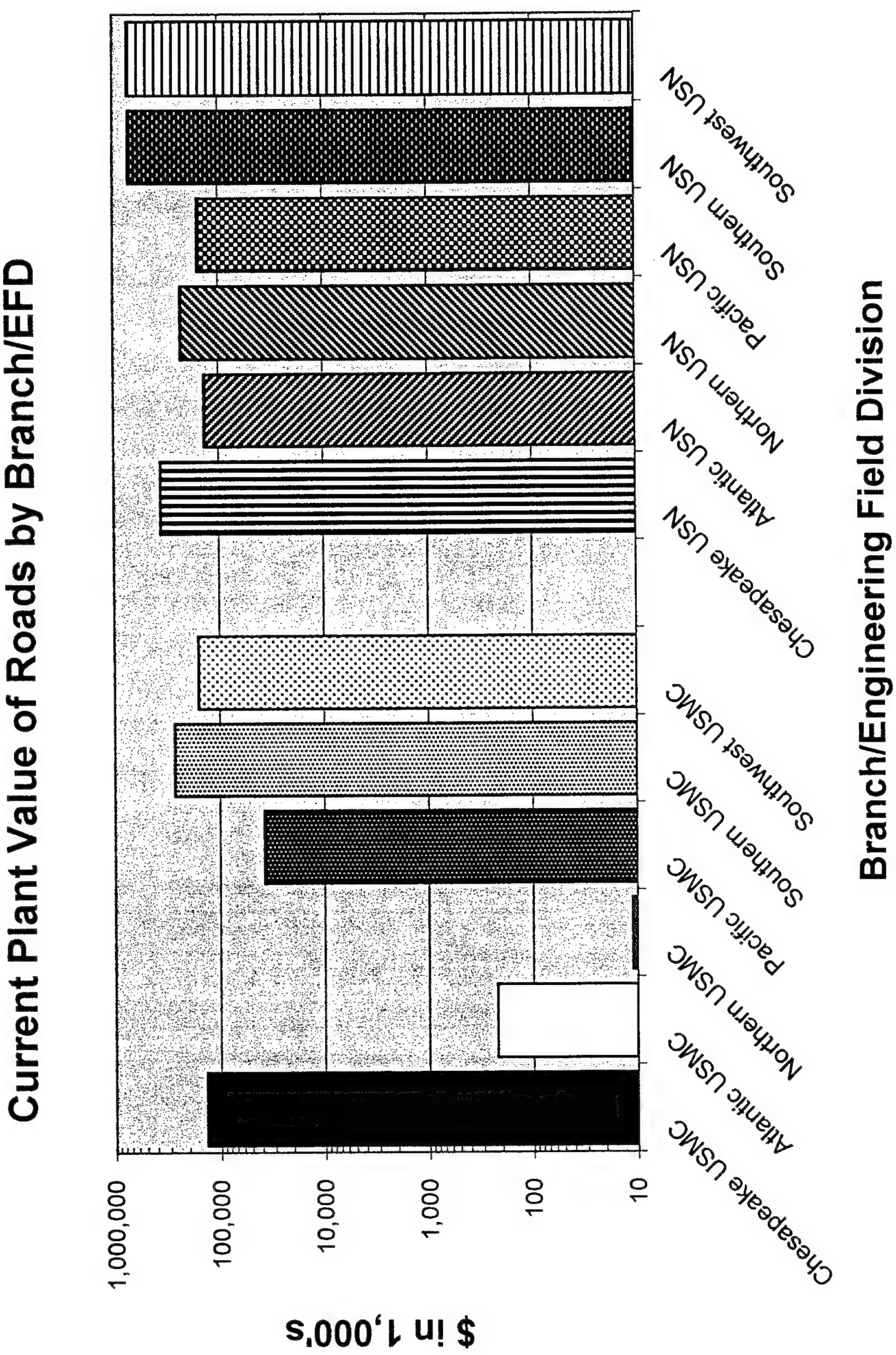
Coped from "Superpave Construction Guidelines".

Appendix D



Current Plant Value of Roads by Branch/EFD
$ in 1,000's
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
Southwest USN
Southern USN
Pacific USN
Northern USN
Atlantic USN
Chesapeake USN
Southwest USMC
Southern USMC
Pacific USMC
Northern USMC
Atlantic USMC
Chesapeake USMC
Branch/Engineering Field Division

Appendix D



Current Plant Value of Roads by Branch/EFD
$ in 1,000's
1,000,000
100,000
10,000
1,000
100
10
Chesapeake USMC
Atlantic USMC
Northern USMC
Pacific USMC
Southern USMC
Southwest USMC
Chesapeake USN
Atlantic USN
Northern USN
Pacific USN
Southern USN
Southwest USN
Branch/Engineering Field Division

Appendix D
Current Plant Value of Roads by Branch of Service and Engineering Field Division

Branch	Base	State	EFD	CPV (000)
USMC	MARCORPS BASE, QUANTICO	VA	Ches	$134,171
USMC	HDQTRS BN HDQTRS MARCORPS, ARLINGTON	VA	Ches	$268
USMC	MARCORPS BARRACKS, WASHINGTON D C		Ches	$57
	Subtotal for Marine Corps bases in the Chesapeake EFD AOR			$134,496
USMC	MARCORPS CAMP, NORFOLK	VA	Lant	$219
	Subtotal for Marine Corps bases in the Atlantic EFD AOR			$219
USMC	MARCORPS DIST HEADQTRS, GARDEN CITY	NY	North	$11
	Subtotal for Marine Corps bases in the Northern EFD AOR			$11
USMC	MARCORPS BASE, KANEOHE BAY	HI	Pac	$37,005
	Subtotal for Marine Corps bases in the Pacific EFD AOR			$37,005
USMC	MARCORPS LOGISTICS BASE, ALBANY	GA	South	$10,526
USMC	HDQTRS 4TH MAR ARCRFT WNG, NEW ORLEANS	LA	South	$17
USMC	MARCORPS DIVISION HDQTRS, NEW ORLEANS	LA	South	$956
USMC	MARCORPS SUPPORT ACTIVITY, KANSAS CITY	MO	South	$427
USMC	MARCORPS AIR STATION, CHERRY POINT	NC	South	$35,183
USMC	MARCORPS BASE, CAMP LEJEUNE	NC	South	$196,015
USMC	MARCORPS RECRUIT DEPOT, PARRIS ISLAND	SC	South	$8,260
USMC	MARCORPS AIR STATION, BEAUFORT	SC	South	$13,812
	Subtotal for Marine Corps bases in the Southern EFD AOR			$265,196
USMC	MARCORPS AIR STATION, YUMA	AZ	SWest	$8,072
USMC	MARCORPS RECRUIT DEPOT, SAN DIEGO	CA	SWest	$9,600
USMC	MARCORPS BASE, CAMP PENDLETON	CA	SWest	$50,715
USMC	MARCORPS AIR STATION, IRVINE	CA	SWest	$24,074
USMC	MARCORPS LOGISTICS BASE, BARSTOW	CA	SWest	$11,706
USMC	MARCORPS AIR STATION, TUSTIN	CA	SWest	$6,364
USMC	MARCORPS BASE, TWENTYNINE PALMS	CA	SWest	$24,570
USMC	MARCORPS AIR STATION, CAMP PENDLETON	CA	SWest	$424
USMC	MARCORPS AIR STATION, SAN DIEGO	CA	SWest	$21,456
	Subtotal for Marine Corps bases in the Southwest EFD AOR			$156,981
	Subtotal for Marine Corps bases			$593,908

Table 5

Appendix D
Current Plant Value of Roads by Branch of Service and Engineering Field Division

Branch	Base	State	EFD	CPV (000)
USN	SCOL/ACADEMY, ANNAPOLIS	MD	Ches	$15,549
USN	MEDICAL CLINIC, ANNAPOLIS	MD	Ches	$431
USN	RESEARCH CENTER, BETHESDA	MD	Ches	$2,724
USN	NATNAVMEDCEN BETHESDA MD, BETHESDA	MD	Ches	$9,604
USN	ORDNANCE STATION, INDIAN HEAD	MD	Ches	$65,677
USN	AIR WARFARE CTR/AIRCRAFT, PATUXENT RIVER	MD	Ches	$113,789
USN	TRAINING CENTER, BAINBRIDGE	MD	Ches	$18,333
USN	SPACE COMMAND, DAHLGREN	VA	Ches	$1,290
USN	WEAPONS STATION, YORKTOWN	VA	Ches	$40,291
USN	SURFACE WEAPONS CENTER, DAHLGREN	VA	Ches	$32,255
USN	MEDICAL CLINIC, QUANTICO	VA	Ches	$775
USN	PETROLEUM OFFICE, ALEXANDRIA	VA	Ches	$3,938
USN	SECURITY GROUP ACTIVITY, CHESAPEAKE	VA	Ches	$2,649
USN	COMM AREA MASTER STATION, NORFOLK	VA	Ches	$44
USN	AIR FACILITY, WASHINGTON DC		Ches	$174
USN	DISTRICT COMMANDANT, WASHINGTON D C		Ches	$27,182
USN	LABORATORY, WASHINGTON DC		Ches	$14,793
USN	COMMUNICATION UNIT, DC		Ches	$723
USN	OBSERVATORY, WASHINGTON D C		Ches	$1,343
USN	PUBLIC WORKS CENTER, WASHINGTON DC		Ches	$2,972
	Subtotal for Navy bases in the Chesapeake EFD AOR			$354,536
USN	SHIPYARD, PORTSMOUTH	VA	Lant	$18,089
USN	HOSPITAL, PORTSMOUTH	VA	Lant	$2,637
USN	PUBLIC WORKS CENTER, NORFOLK	VA	Lant	$20,393
USN	AIR STATION, NORFOLK	VA	Lant	$25,904
USN	SUPPLY CENTER, NORFOLK	VA	Lant	$6,151
USN	FLT COMBAT TRNG CENTER, DAM NECK	VA	Lant	$7,826
USN	LANTFLT HQ SUP ACT, NORFOLK	VA	Lant	$1,384
USN	SUPPLY CENTER ANNEX, WILLIAMSBURG	VA	Lant	$2,064
USN	AIR STATION, VIRGINIA BEACH	VA	Lant	$15,334
USN	AMPHIBIOUS BASE, NORFOLK	VA	Lant	$23,596
USN	STATION, NORFOLK	VA	Lant	$6,298
USN	ARMED FORCES EXP TRNG ACT, WILLIAMSBURG	VA	Lant	$5,387
	Subtotal for Navy bases in the Atlantic EFD AOR			$135,063

Table 5

Appendix D
Current Plant Value of Roads by Branch of Service and Engineering Field Division

Branch	Base	State	EFD	CPV (000)
USN	SUBMARINE BASE, GROTON	CT	North	$22,034
USN	WEAPONS INDUST RES PLANT, BEDFORD	MA	North	$635
USN	SECURITY GROUP ACTIVITY, WINTER HARBOR	ME	North	$1,830
USN	AIR STATION, BRUNSWICK	ME	North	$14,537
USN	COMMUNICATION UNIT, EAST MACHIAS	ME	North	$14,097
USN	SHIPYARD, PORTSMOUTH	NH	North	$15,655
USN	WEAPONS STATION, COLTS NECK	NJ	North	$43,933
USN	AIR WARFARE CTR/AIRCRAFT, TRENTON	NJ	North	$1,453
USN	AIR WARFARE CTR/AIRCRAFT, LAKEHURST	NJ	North	$16,884
USN	WEAPONS INDUST RES PLANT, BETHPAGE	NY	North	$634
USN	WEAPONS INDUST RES PLANT, CALVERTON	NY	North	$2,986
USN	INVENTORY CONTROL POINT, MECHANICSBURG	PA	North	$37,923
USN	AIR STATION, WILLOW GROVE	PA	North	$6,643
USN	AVIATION SUPPLY OFFICE, PHILADELPHIA	PA	North	$6,512
USN	SCOL/WAR COLLEGE, NEWPORT	RI	North	$94
USN	EDUCATION & TRAINING CTR, NEWPORT	RI	North	$21,295
USN	UNDERWATER SYSTEMS CENTER, NEWPORT	RI	North	$4,365
USN	HOSPITAL, NEWPORT	RI	North	$1,702
USN	SECURITY GROUP ACTIVITY, SUGAR GROVE	WV	North	$4,184
USN	INDUST RES ORDNANCE PLANT, ROCKET CENTER	WV	North	$6,382
	Subtotal for Navy bases in the Northern EFD AOR			$223,778
USN	AIR STATION, BARBERS POINT	HI	Pac	$39,986
USN	SUPPLY CENTER, HONOLULU	HI	Pac	$6,525
USN	COMPUTER & TELECOMMUNICAT, WAHIAWA	HI	Pac	$7,758
USN	MISSILE RANGE FACILITY, KAUAI	HI	Pac	$5,657
USN	SHIPYARD/INTERMEDIATE FAC, PEARL HARBOR	HI	Pac	$5,091
USN	PUBLIC WORKS CENTER, PEARL HARBOR	HI	Pac	$22,216
USN	STATION, PEARL HARBOR	HI	Pac	$31,749
USN	MAGAZINE, LUALUALEI	HI	Pac	$37,029
	Subtotal for Navy bases in the Pacific EFD AOR			$156,011

Table 5

Appendix D
Current Plant Value of Roads by Branch of Service and Engineering Field Division

Branch	Base	State	EFD	CPV (000)
USN	HOSPITAL, PENSACOLA	FL	South	$205
USN	AIR STATION, PENSACOLA	FL	South	$99,565
USN	AIR STATION, JACKSONVILLE	FL	South	$39,216
USN	AIR STATION, KEY WEST	FL	South	$23,141
USN	MEDICAL CLINIC, KEY WEST	FL	South	$464
USN	AIR STATION, CECIL FIELD	FL	South	$34,007
USN	STATION, MAYPORT	FL	South	$5,723
USN	AIR STATION, MILTON	FL	South	$7,973
USN	COASTAL SYSTEMS CENTER, PANAMA CITY	FL	South	$4,474
USN	TRAINING SYSTEMS CENTER, ORLANDO	FL	South	$366
USN	TECHNICAL TRAINING CENTER, PENSACOLA	FL	South	$2,916
USN	COMMUNICATION UNIT, KEY WEST	FL	South	$308
USN	TRAINING CENTER, ORLANDO	FL	South	$17,243
USN	SUPPLY CENTER, JACKSONVILLE	FL	South	$1,739
USN	AIR STATION, MARIETTA	GA	South	$848
USN	SUBMARINE BASE, KINGS BAY	GA	South	$64,158
USN	SCOL/SUPPLY CORPS, ATHENS	GA	South	$642
USN	TRAINING CENTER, GREAT LAKES	IL	South	$18,235
USN	HOSPITAL, GREAT LAKES	IL	South	$5,295
USN	NAVAL AIR STATION, GLENVIEW	IL	South	$6,973
USN	PUBLIC WORKS CENTER, GREAT LAKES	IL	South	$18,378
USN	AVIONICS CENTER, INDIANAPOLIS	IN	South	$2,395
USN	WEAPONS SUPPORT CENTER, CRANE	IN	South	$156,147
USN	SUPPORT ACTIVITY, NEW ORLEANS	LA	South	$14,652
USN	AIR STATION, BELLE CHASSE	LA	South	$10,163
USN	INDUST RES ORDNANCE PLANT, MINNEAPOLIS	MN	South	$1,007
USN	CONSTRUCTION BATTALN CTR, GULFPORT	MS	South	$17,443
USN	AIR STATION, MERIDIAN	MS	South	$11,504
USN	STATION, PASCAGOULA	MS	South	$4,101
USN	HOSPITAL, CAMP LEJEUNE	NC	South	$729
USN	HOSPITAL, BEAUFORT	SC	South	$1,215
USN	NAVAL WEAPONS STATION, GOOSE CREEK	SC	South	$46,981
USN	NAVAL SUPPORT ACTIVITY, MILLINGTON	TN	South	$22,873
USN	NAVSUPPACT MEMPHIS	TN	South	$6,847
USN	WEAPONS INDUST RES PLANT, BRISTOL	TN	South	$887
USN	AIR STATION, DALLAS	TX	South	$6,387
USN	AIR STATION, CORPUS CHRISTI	TX	South	$21,393
USN	HOSPITAL, CORPUS CHRISTI	TX	South	$165
USN	AIR STATION, KINGSVILLE	TX	South	$8,626
USN	STATION, INGLESIDE	TX	South	$5,054
USN	WEAPONS INDUST RES PLANT, MCGREGOR	TX	South	$4,864
	Subtotal for Navy bases in the Southern EFD AOR			$695,302

Table 5

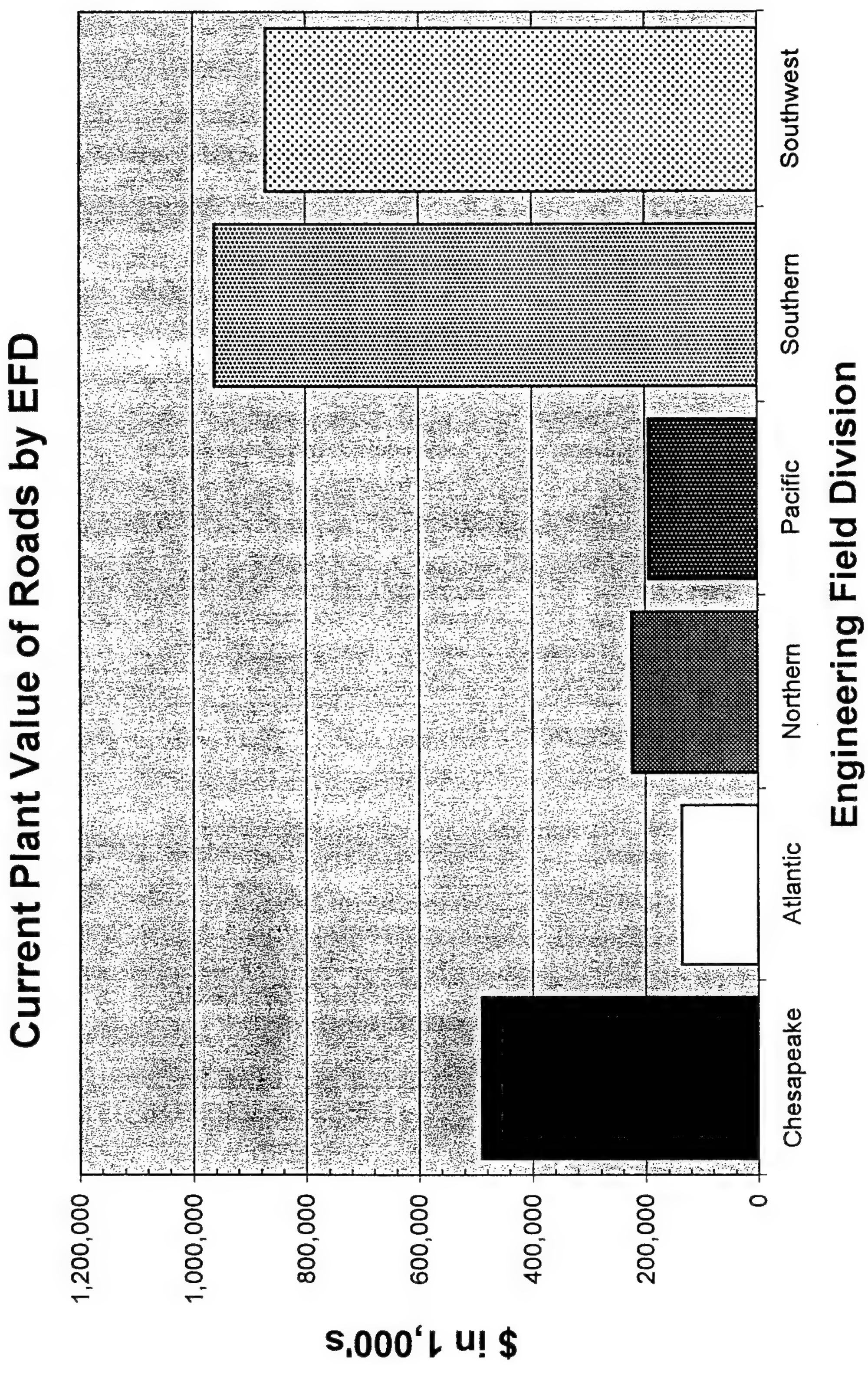
Appendix D
Current Plant Value of Roads by Branch of Service and Engineering Field Division

Branch	Base	State	EFD	CPV (000)
USN	LABORATORY, BARROW	AL	SWest	$271
USN	BASE, SAN DIEGO	CA	SWest	$15,448
USN	SUPPLY CENTER, SAN DIEGO	CA	SWest	$2,974
USN	STATION, SAN DIEGO	CA	SWest	$11,609
USN	AIR STATION, SAN DIEGO	CA	SWest	$28,507
USN	HOSPITAL, SAN DIEGO	CA	SWest	$2,034
USN	SECURITY GROUP ACTIVITY, SKAGGS ISLAND	CA	SWest	$4,103
USN	FLT ANTI-SUB WARF TRN CTR, SAN DIEGO	CA	SWest	$777
USN	DBOF, PT MUGU	CA	SWest	$18,613
USN	FACILITY, FERNDALE	CA	SWest	$779
USN	AIR FACILITY, EL CENTRO	CA	SWest	$14,306
USN	WEAPONS SUPPORT FACILITY, SEAL BEACH	CA	SWest	$64,190
USN	SCOL/POSTGRADUATE, MONTEREY	CA	SWest	$10,502
USN	AIR STATION, LEMOORE	CA	SWest	$23,623
USN	SUBMARINE BASE, SAN DIEGO	CA	SWest	$5,100
USN	NAVAL WARFARE ASSESSMENT, CORONA	CA	SWest	$538
USN	WARFARE SYSTEM CENTER, SAN DIEGO	CA	SWest	$7,847
USN	HOSPITAL, CAMP PENDLETON	CA	SWest	$438
USN	AIR WEAPONS STATION, CHINA LAKE	CA	SWest	$207,435
USN	CONSTRUCT BATTALION CTR, PORT HUENEME	CA	SWest	$5,508
USN	COMPUTER & TELCOMMTN. SAT, SAN DIEGO	CA	SWest	$10,093
USN	INDUST RES ORDNANCE PLANT, SUNNYVALE	CA	SWest	$3,703
USN	AIR STATION, FALLON	NV	SWest	$16,370
USN	INDUST RES ORDNANCE PLANT, MAGNA	UT	SWest	$1,680
USN	SHIPYARD, BREMERTON	WA	SWest	$15,650
USN	UNDERSEA WARFARE CEN DIV, KEYPORT	WA	SWest	$83,436
USN	SUPPLY CENTER, BREMERTON	WA	SWest	$4,228
USN	AIR STATION, OAK HARBOR	WA	SWest	$42,192
USN	STRATEGIC WEAPONS FAC, SILVERDALE	WA	SWest	$12,352
USN	SUBMARINE BASE, BANGOR	WA	SWest	$89,544
USN	STATION, EVERETT	WA	SWest	$5,178
USN	RADIO STATION, OSO	WA	SWest	$4,402
	Subtotal for Navy bases in the Southwest EFD AOR			$713,430
	Subtotal for Navy bases			$2,278,120
	Total for all Bases			**$2,872,028**

NOTE: This table includes only those bases that are within the boundaries of the 50 States, and does not include bases in territories or foreign countries. It also does not include Reserve Centers or facilities in caretaker status.

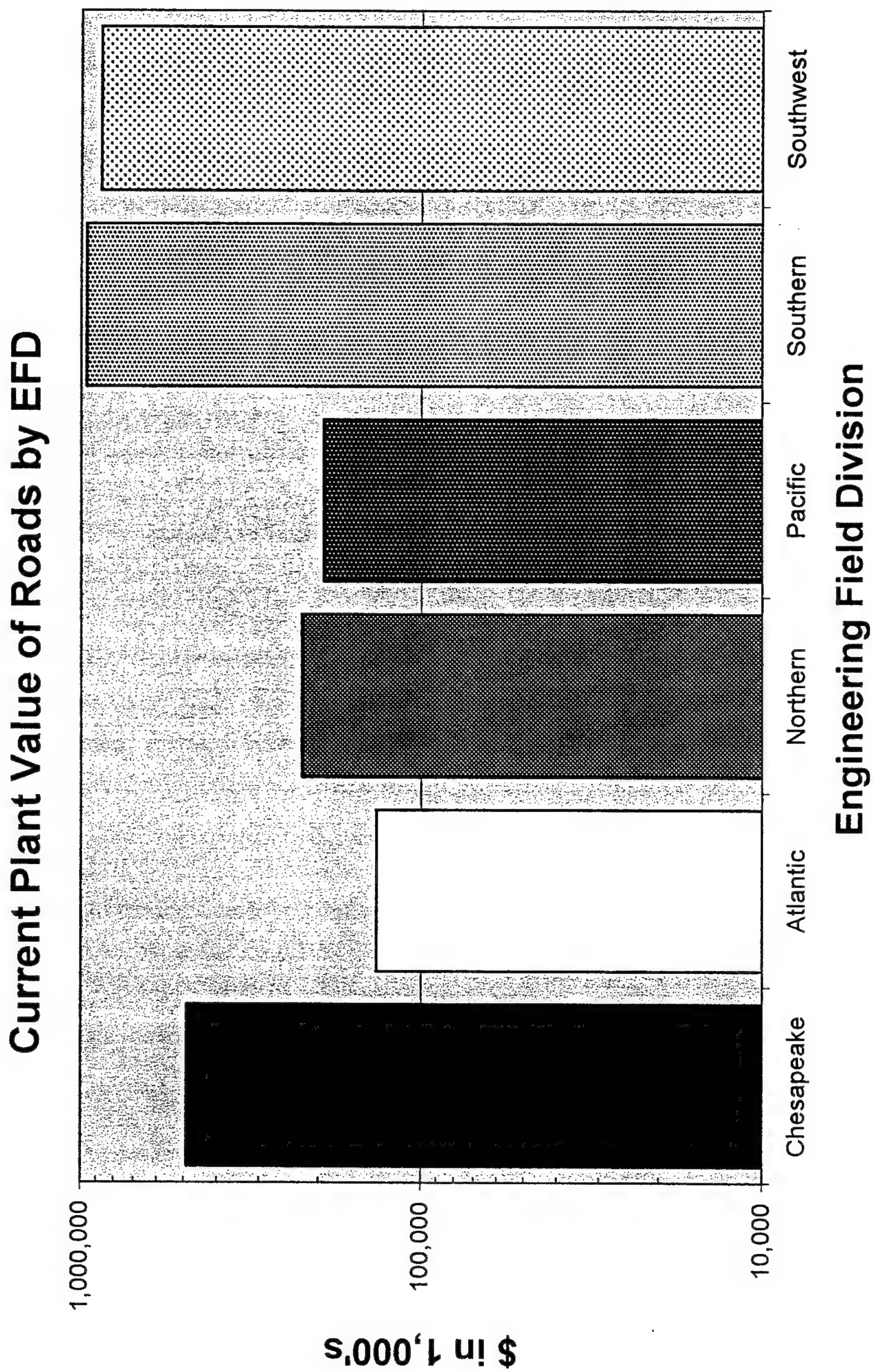
Table 5

Appendix E



Current Plant Value of Roads by EFD
$ in 1,000's
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
Chesapeake
Atlantic
Northern
Pacific
Southern
Southwest
Engineering Field Division

Appendix E



Current Plant Value of Roads by EFD
$ in 1,000's
1,000,000
100,000
10,000
Chesapeake
Atlantic
Northern
Pacific
Southern
Southwest
Engineering Field Division

Appendix E
Current Plant Value of Roads by Engineering Field Division

Branch	Base	State	EFD	CPV (000)
USN	SCOL/ACADEMY, ANNAPOLIS	MD	Ches	$15,549
USN	MEDICAL CLINIC, ANNAPOLIS	MD	Ches	$431
USN	RESEARCH CENTER, BETHESDA	MD	Ches	$2,724
USN	NATNAVMEDCEN BETHESDA MD, BETHESDA	MD	Ches	$9,604
USN	ORDNANCE STATION, INDIAN HEAD	MD	Ches	$65,677
USN	AIR WARFARE CTR/AIRCRAFT, PATUXENT RIVER	MD	Ches	$113,789
USN	TRAINING CENTER, BAINBRIDGE	MD	Ches	$18,333
USN	SPACE COMMAND, DAHLGREN	VA	Ches	$1,290
USN	WEAPONS STATION, YORKTOWN	VA	Ches	$40,291
USN	SURFACE WEAPONS CENTER, DAHLGREN	VA	Ches	$32,255
USN	MEDICAL CLINIC, QUANTICO	VA	Ches	$775
USN	PETROLEUM OFFICE, ALEXANDRIA	VA	Ches	$3,938
USN	SECURITY GROUP ACTIVITY, CHESAPEAKE	VA	Ches	$2,649
USN	COMM AREA MASTER STATION, NORFOLK	VA	Ches	$44
USMC	MARCORPS BASE, QUANTICO	VA	Ches	$134,171
USMC	HDQTRS BN HDQTRS MARCORPS, ARLINGTON	VA	Ches	$268
USN	AIR FACILITY, WASHINGTON DC		Ches	$174
USN	DISTRICT COMMANDANT, WASHINGTON D C		Ches	$27,182
USN	LABORATORY, WASHINGTON DC		Ches	$14,793
USN	COMMUNICATION UNIT, DC		Ches	$723
USN	OBSERVATORY, WASHINGTON D C		Ches	$1,343
USN	PUBLIC WORKS CENTER, WASHINGTON DC		Ches	$2,972
USMC	MARCORPS BARRACKS, WASHINGTON D C		Ches	$57
	Subtotal for Chesapeake Division			$489,032
USN	SHIPYARD, PORTSMOUTH	VA	Lant	$18,089
USN	HOSPITAL, PORTSMOUTH	VA	Lant	$2,637
USN	PUBLIC WORKS CENTER, NORFOLK	VA	Lant	$20,393
USN	AIR STATION, NORFOLK	VA	Lant	$25,904
USN	SUPPLY CENTER, NORFOLK	VA	Lant	$6,151
USN	FLT COMBAT TRNG CENTER, DAM NECK	VA	Lant	$7,826
USN	LANTFLT HQ SUP ACT, NORFOLK	VA	Lant	$1,384
USN	SUPPLY CENTER ANNEX, WILLIAMSBURG	VA	Lant	$2,064
USN	AIR STATION, VIRGINIA BEACH	VA	Lant	$15,334
USN	AMPHIBIOUS BASE, NORFOLK	VA	Lant	$23,596
USN	STATION, NORFOLK	VA	Lant	$6,298
USN	ARMED FORCES EXP TRNG ACT, WILLIAMSBURG	VA	Lant	$5,387
USMC	MARCORPS CAMP, NORFOLK	VA	Lant	$219
	Subtotal for Atlantic Division			$135,282
USN	SUBMARINE BASE, GROTON	CT	North	$22,034
USN	WEAPONS INDUST RES PLANT, BEDFORD	MA	North	$635
USN	SECURITY GROUP ACTIVITY, WINTER HARBOR	ME	North	$1,830
USN	AIR STATION, BRUNSWICK	ME	North	$14,537
USN	COMMUNICATION UNIT, EAST MACHIAS	ME	North	$14,097
USN	SHIPYARD, PORTSMOUTH	NH	North	$15,655
USN	WEAPONS STATION, COLTS NECK	NJ	North	$43,933

Table 6

Appendix E
Current Plant Value of Roads by Engineering Field Division

Branch	Base	State	EFD	CPV (000)
USN	AIR WARFARE CTR/AIRCRAFT, TRENTON	NJ	North	$1,453
USN	AIR WARFARE CTR/AIRCRAFT, LAKEHURST	NJ	North	$16,884
USN	WEAPONS INDUST RES PLANT, BETHPAGE	NY	North	$634
USN	WEAPONS INDUST RES PLANT, CALVERTON	NY	North	$2,986
USMC	MARCORPS DIST HEADQTRS, GARDEN CITY	NY	North	$11
USN	INVENTORY CONTROL POINT, MECHANICSBURG	PA	North	$37,923
USN	AIR STATION, WILLOW GROVE	PA	North	$6,643
USN	AVIATION SUPPLY OFFICE, PHILADELPHIA	PA	North	$6,512
USN	SCOL/WAR COLLEGE, NEWPORT	RI	North	$94
USN	EDUCATION & TRAINING CTR, NEWPORT	RI	North	$21,295
USN	INDERWATER SYSTEMS CENTER, NEWPORT RHOD	RI	North	$4,365
USN	HOSPITAL, NEWPORT	RI	North	$1,702
USN	SECURITY GROUP ACTIVITY, SUGAR GROVE	WV	North	$4,184
USN	INDUST RES ORDNANCE PLANT, ROCKET CENTER	WV	North	$6,382
	Subtotal for Northern Division			$223,789
USN	AIR STATION, BARBERS POINT	HI	Pac	$39,986
USN	SUPPLY CENTER, HONOLULU	HI	Pac	$6,525
USN	COMPUTER & TELECOMMUNICAT, WAHIAWA	HI	Pac	$7,758
USN	MISSILE RANGE FACILITY, KAUAI	HI	Pac	$5,657
USN	SHIPYARD/INTERMEDIATE FAC, PEARL HARBOR	HI	Pac	$5,091
USN	PUBLIC WORKS CENTER, PEARL HARBOR	HI	Pac	$22,216
USN	STATION, PEARL HARBOR	HI	Pac	$31,749
USN	MAGAZINE, LUALUALEI	HI	Pac	$37,029
USMC	MARCORPS BASE, KANEOHE BAY	HI	Pac	$37,005
	Subtotal for Pacific Division			$193,016
USN	HOSPITAL, PENSACOLA	FL	South	$205
USN	AIR STATION, PENSACOLA	FL	South	$99,565
USN	AIR STATION, JACKSONVILLE	FL	South	$39,216
USN	AIR STATION, KEY WEST	FL	South	$23,141
USN	MEDICAL CLINIC, KEY WEST	FL	South	$464
USN	AIR STATION, CECIL FIELD	FL	South	$34,007
USN	STATION, MAYPORT	FL	South	$5,723
USN	AIR STATION, MILTON	FL	South	$7,973
USN	COASTAL SYSTEMS CENTER, PANAMA CITY	FL	South	$4,474
USN	TRAINING SYSTEMS CENTER, ORLANDO	FL	South	$366
USN	TECHNICAL TRAINING CENTER, PENSACOLA	FL	South	$2,916
USN	COMMUNICATION UNIT, KEY WEST	FL	South	$308
USN	TRAINING CENTER, ORLANDO	FL	South	$17,243
USN	SUPPLY CENTER, JACKSONVILLE	FL	South	$1,739
USN	AIR STATION, MARIETTA	GA	South	$848
USN	SUBMARINE BASE, KINGS BAY	GA	South	$64,158
USN	SCOL/SUPPLY CORPS, ATHENS	GA	South	$642
USMC	MARCORPS LOGISTICS BASE, ALBANY	GA	South	$10,526
USN	TRAINING CENTER, GREAT LAKES	IL	South	$18,235
USN	HOSPITAL, GREAT LAKES	IL	South	$5,295

Table 6

Appendix E
Current Plant Value of Roads by Engineering Field Division

Branch	Base	State	EFD	CPV (000)
USN	NAVAL AIR STATION, GLENVIEW	IL	South	$6,973
USN	PUBLIC WORKS CENTER, GREAT LAKES	IL	South	$18,378
USN	AVIONICS CENTER, INDIANAPOLIS	IN	South	$2,395
USN	WEAPONS SUPPORT CENTER, CRANE	IN	South	$156,147
USN	SUPPORT ACTIVITY, NEW ORLEANS	LA	South	$14,652
USN	AIR STATION, BELLE CHASSE	LA	South	$10,163
USMC	HDQTRS 4TH MAR ARCRFT WNG, NEW ORLEANS	LA	South	$17
USMC	MARCORPS DIVISION HDQTRS, NEW ORLEANS	LA	South	$956
USN	INDUST RES ORDNANCE PLANT, MINNEAPOLIS	MN	South	$1,007
USMC	MARCORPS SUPPORT ACTIVITY, KANSAS CITY	MO	South	$427
USN	CONSTRUCTION BATTALN CTR, GULFPORT	MS	South	$17,443
USN	AIR STATION, MERIDIAN	MS	South	$11,504
USN	STATION, PASCAGOULA	MS	South	$4,101
USN	HOSPITAL, CAMP LEJEUNE	NC	South	$729
USMC	MARCORPS AIR STATION, CHERRY POINT	NC	South	$35,183
USMC	MARCORPS BASE, CAMP LEJEUNE	NC	South	$196,015
USN	HOSPITAL, BEAUFORT	SC	South	$1,215
USN	NAVAL WEAPONS STATION, GOOSE CREEK	SC	South	$46,981
USMC	MARCORPS RECRUIT DEPOT, PARRIS ISLAND	SC	South	$8,260
USMC	MARCORPS AIR STATION, BEAUFORT	SC	South	$13,812
USN	NAVAL SUPPORT ACTIVITY, MILLINGTON	TN	South	$22,873
USN	NAVSUPPACT MEMPHIS	TN	South	$6,847
USN	WEAPONS INDUST RES PLANT, BRISTOL	TN	South	$887
USN	AIR STATION, DALLAS	TX	South	$6,387
USN	AIR STATION, CORPUS CHRISTI	TX	South	$21,393
USN	HOSPITAL, CORPUS CHRISTI	TX	South	$165
USN	AIR STATION, KINGSVILLE	TX	South	$8,626
USN	STATION, INGLESIDE	TX	South	$5,054
USN	WEAPONS INDUST RES PLANT, MCGREGOR	TX	South	$4,864
	Subtotal for Southern Division			$960,498
USN	LABORATORY, BARROW	AL	SWest	$271
USMC	MARCORPS AIR STATION, YUMA	AZ	SWest	$8,072
USN	BASE, SAN DIEGO	CA	SWest	$15,448
USN	SUPPLY CENTER, SAN DIEGO	CA	SWest	$2,974
USN	STATION, SAN DIEGO	CA	SWest	$11,609
USN	AIR STATION, SAN DIEGO	CA	SWest	$28,507
USN	HOSPITAL, SAN DIEGO	CA	SWest	$2,034
USN	SECURITY GROUP ACTIVITY, SKAGGS ISLAND	CA	SWest	$4,103
USN	FLT ANTI-SUB WARF TRN CTR, SAN DIEGO	CA	SWest	$777
USN	DBOF, PT MUGU	CA	SWest	$18,613
USN	FACILITY, FERNDALE	CA	SWest	$779
USN	AIR FACILITY, EL CENTRO	CA	SWest	$14,306
USN	WEAPONS SUPPORT FACILITY, SEAL BEACH	CA	SWest	$64,190
USN	SCOL/POSTGRADUATE, MONTEREY	CA	SWest	$10,502
USN	AIR STATION, LEMOORE	CA	SWest	$23,623
USN	SUBMARINE BASE, SAN DIEGO	CA	SWest	$5,100

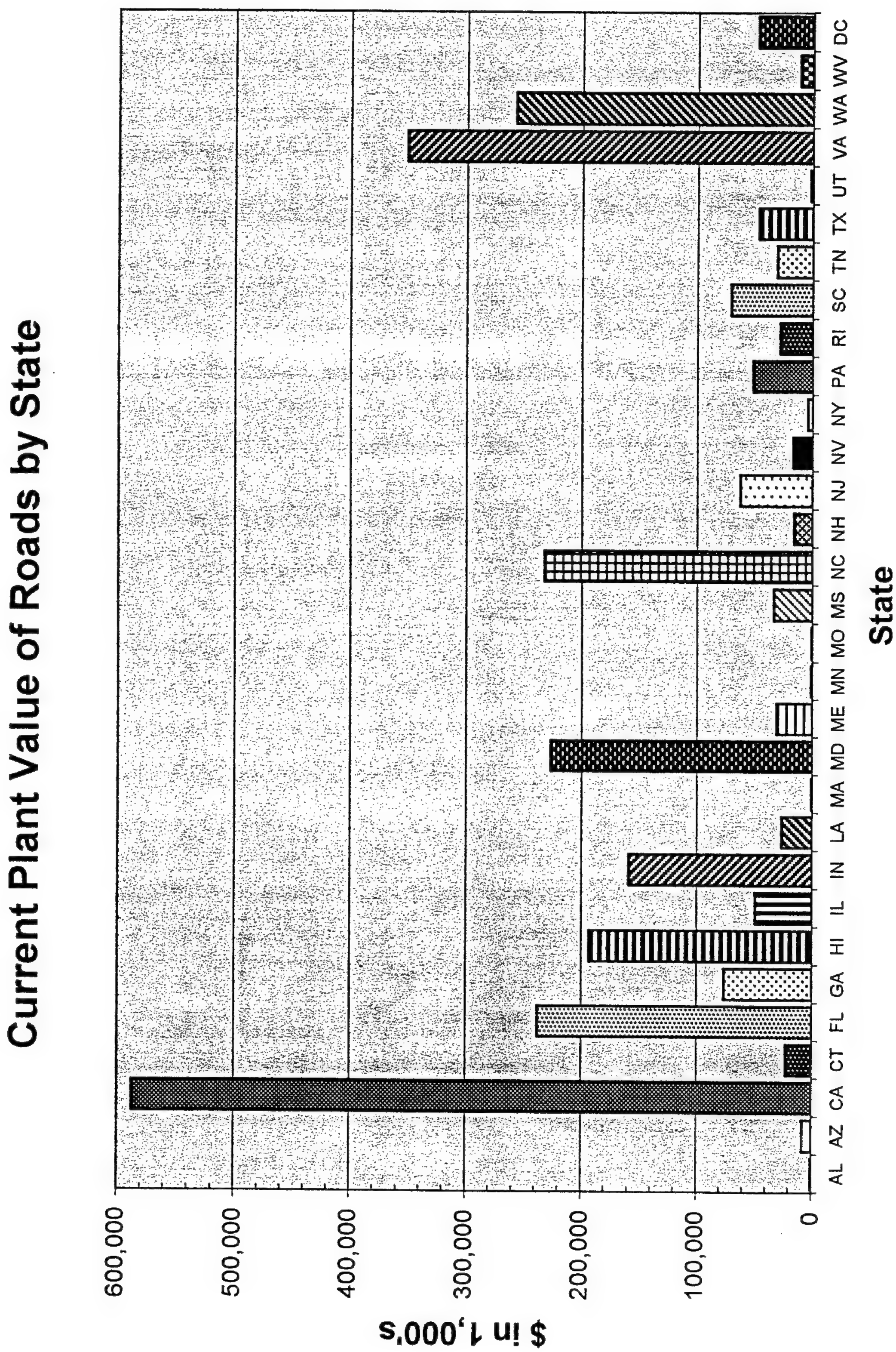
Table 6

Appendix E
Current Plant Value of Roads
by Engineering Field Division

Branch	Base	State	EFD	CPV (000)
USN	NAVAL WARFARE ASSESSMENT, CORONA	CA	SWest	$538
USN	WARFARE SYSTEM CENTER, SAN DIEGO	CA	SWest	$7,847
USN	HOSPITAL, CAMP PENDLETON	CA	SWest	$438
USN	AIR WEAPONS STATION, CHINA LAKE	CA	SWest	$207,435
USN	CONSTRUCT BATTALION CTR, PORT HUENEME	CA	SWest	$5,508
USN	COMPUTER & TELCOMMTN. SAT, SAN DIEGO	CA	SWest	$10,093
USN	INDUST RES ORDNANCE PLANT, SUNNYVALE	CA	SWest	$3,703
USMC	MARCORPS RECRUIT DEPOT, SAN DIEGO	CA	SWest	$9,600
USMC	MARCORPS BASE, CAMP PENDLETON	CA	SWest	$50,715
USMC	MARCORPS AIR STATION, IRVINE	CA	SWest	$24,074
USMC	MARCORPS LOGISTICS BASE, BARSTOW	CA	SWest	$11,706
USMC	MARCORPS AIR STATION, TUSTIN	CA	SWest	$6,364
USMC	MARCORPS BASE, TWENTYNINE PALMS	CA	SWest	$24,570
USMC	MARCORPS AIR STATION, CAMP PENDLETON	CA	SWest	$424
USMC	MARCORPS AIR STATION, SAN DIEGO	CA	SWest	$21,456
USN	AIR STATION, FALLON	NV	SWest	$16,370
USN	INDUST RES ORDNANCE PLANT, MAGNA	UT	SWest	$1,680
USN	SHIPYARD, BREMERTON	WA	SWest	$15,650
USN	UNDERSEA WARFARE CEN DIV, KEYPORT	WA	SWest	$83,436
USN	SUPPLY CENTER, BREMERTON	WA	SWest	$4,228
USN	AIR STATION, OAK HARBOR	WA	SWest	$42,192
USN	STRATEGIC WEAPONS FAC, SILVERDALE	WA	SWest	$12,352
USN	SUBMARINE BASE, BANGOR	WA	SWest	$89,544
USN	STATION, EVERETT	WA	SWest	$5,178
USN	RADIO STATION, OSO	WA	SWest	$4,402
	Subtotal for Southwest Division			$870,411
	Total for all Divisions			**$2,872,028**

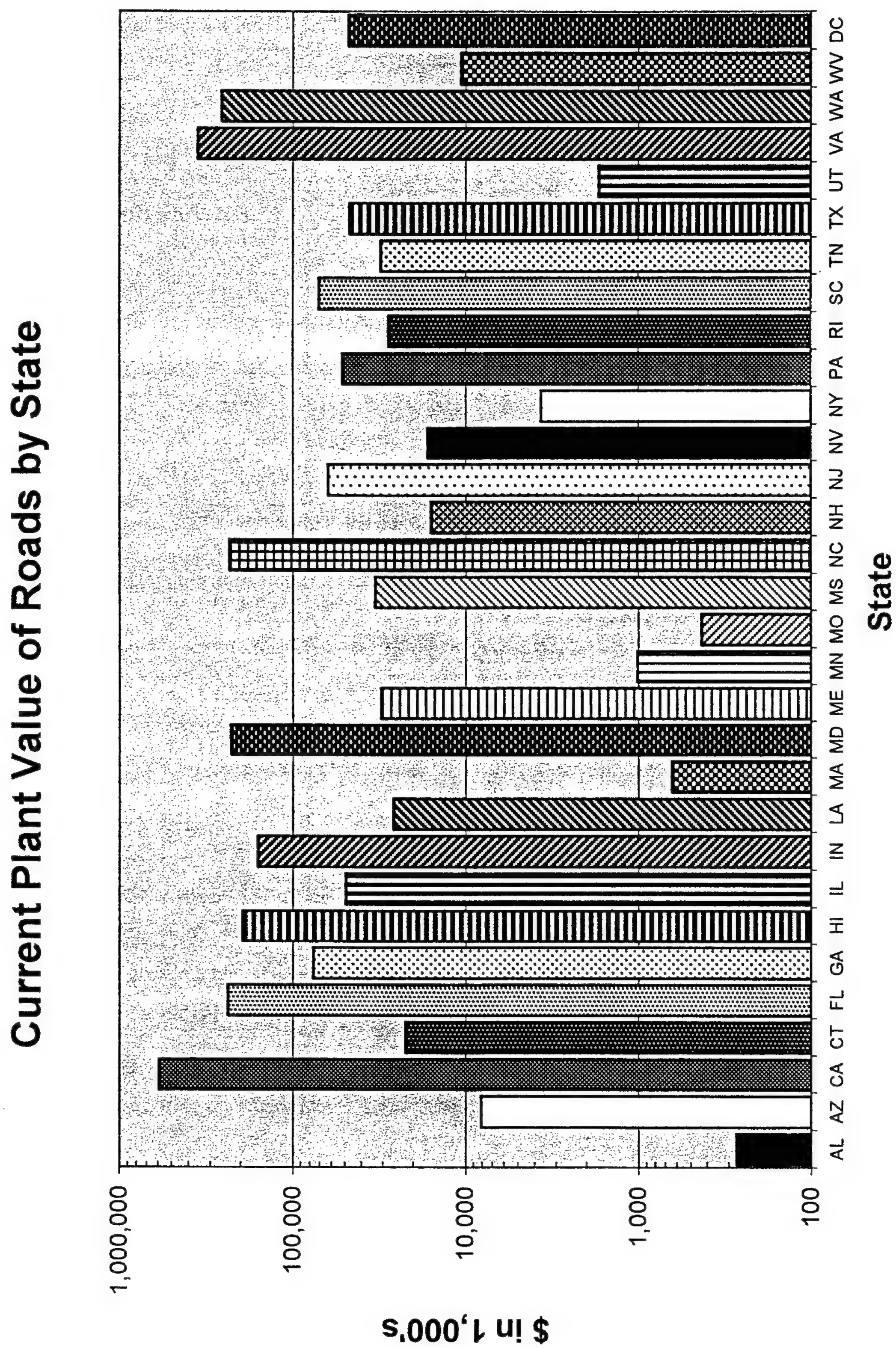
Table 6

Appendix F



Current Plant Value of Roads by State
$ in 1,000's
600,000
500,000
400,000
300,000
200,000
100,000
0
AL AZ CA CT FL GA HI IL IN LA MA MD ME MN MO MS NC NH NJ NV NY PA RI SC TN TX UT VA WA WV DC
State

Appendix F


Current Plant Value of Roads by State
$ in 1,000's
1,000,000
100,000
10,000
1,000
100
State
AL
AZ
CA
CT
FL
GA
HI
IL
IN
LA
MA
MD
ME
MN
MO
MS
NC
NH
NJ
NV
NY
PA
RI
SC
TN
TX
UT
VA
WA
WV
DC

Appendix F
Current Plant Value of Roads by State

Branch	Base	State	EFD	CPV (000)
USN	LABORATORY, BARROW	AL	SWest	$271
		Subtotal for Alabama		$271
USMC	MARCORPS AIR STATION, YUMA	AZ	SWest	$8,072
		Subtotal for Arizona		$8,072
USN	BASE, SAN DIEGO	CA	SWest	$15,448
USN	SUPPLY CENTER, SAN DIEGO	CA	SWest	$2,974
USN	STATION, SAN DIEGO	CA	SWest	$11,609
USN	AIR STATION, SAN DIEGO	CA	SWest	$28,507
USN	HOSPITAL, SAN DIEGO	CA	SWest	$2,034
USN	SECURITY GROUP ACTIVITY, SKAGGS ISLAND	CA	SWest	$4,103
USN	FLT ANTI-SUB WARF TRN CTR, SAN DIEGO	CA	SWest	$777
USN	DBOF, PT MUGU	CA	SWest	$18,613
USN	FACILITY, FERNDALE	CA	SWest	$779
USN	AIR FACILITY, EL CENTRO	CA	SWest	$14,306
USN	WEAPONS SUPPORT FACILITY, SEAL BEACH	CA	SWest	$64,190
USN	SCOL/POSTGRADUATE, MONTEREY	CA	SWest	$10,502
USN	AIR STATION, LEMOORE	CA	SWest	$23,623
USN	SUBMARINE BASE, SAN DIEGO	CA	SWest	$5,100
USN	NAVAL WARFARE ASSESSMENT, CORONA	CA	SWest	$538
USN	WARFARE SYSTEM CENTER, SAN DIEGO	CA	SWest	$7,847
USN	HOSPITAL, CAMP PENDLETON	CA	SWest	$438
USN	AIR WEAPONS STATION, CHINA LAKE	CA	SWest	$207,435
USN	CONSTRUCT BATTALION CTR, PORT HUENEME	CA	SWest	$5,508
USN	COMPUTER & TELCOMMTN. SAT, SAN DIEGO	CA	SWest	$10,093
USN	INDUST RES ORDNANCE PLANT, SUNNYVALE	CA	SWest	$3,703
USMC	MARCORPS RECRUIT DEPOT, SAN DIEGO	CA	SWest	$9,600
USMC	MARCORPS BASE, CAMP PENDLETON	CA	SWest	$50,715
USMC	MARCORPS AIR STATION, IRVINE	CA	SWest	$24,074
USMC	MARCORPS LOGISTICS BASE, BARSTOW	CA	SWest	$11,706
USMC	MARCORPS AIR STATION, TUSTIN	CA	SWest	$6,364
USMC	MARCORPS BASE, TWENTYNINE PALMS	CA	SWest	$24,570
USMC	MARCORPS AIR STATION, CAMP PENDLETON	CA	SWest	$424
USMC	MARCORPS AIR STATION, SAN DIEGO	CA	SWest	$21,456
		Subtotal for California		$587,036
USN	SUBMARINE BASE, GROTON	CT	North	$22,034
		Subtotal for Connecticut		$22,034

Table 7

Appendix F
Current Plant Value of Roads by State

Branch	Base	State	EFD	CPV (000)
USN	HOSPITAL, PENSACOLA	FL	South	$205
USN	AIR STATION, PENSACOLA	FL	South	$99,565
USN	AIR STATION, JACKSONVILLE	FL	South	$39,216
USN	AIR STATION, KEY WEST	FL	South	$23,141
USN	MEDICAL CLINIC, KEY WEST	FL	South	$464
USN	AIR STATION, CECIL FIELD	FL	South	$34,007
USN	STATION, MAYPORT	FL	South	$5,723
USN	AIR STATION, MILTON	FL	South	$7,973
USN	COASTAL SYSTEMS CENTER, PANAMA CITY	FL	South	$4,474
USN	TRAINING SYSTEMS CENTER, ORLANDO	FL	South	$366
USN	TECHNICAL TRAINING CENTER, PENSACOLA	FL	South	$2,916
USN	COMMUNICATION UNIT, KEY WEST	FL	South	$308
USN	TRAINING CENTER, ORLANDO	FL	South	$17,243
USN	SUPPLY CENTER, JACKSONVILLE	FL	South	$1,739
		Subtotal for Florida		$237,340
USN	AIR STATION, MARIETTA	GA	South	$848
USN	SUBMARINE BASE, KINGS BAY	GA	South	$64,158
USN	SCOL/SUPPLY CORPS, ATHENS	GA	South	$642
USMC	MARCORPS LOGISTICS BASE, ALBANY	GA	South	$10,526
		Subtotal for Georgia		$76,174
USN	AIR STATION, BARBERS POINT	HI	Pac	$39,986
USN	SUPPLY CENTER, HONOLULU	HI	Pac	$6,525
USN	COMPUTER & TELECOMMUNICAT, WAHIAWA	HI	Pac	$7,758
USN	MISSILE RANGE FACILITY, KAUAI	HI	Pac	$5,657
USN	SHIPYARD/INTERMEDIATE FAC, PEARL HARBOR	HI	Pac	$5,091
USN	PUBLIC WORKS CENTER, PEARL HARBOR	HI	Pac	$22,216
USN	STATION, PEARL HARBOR	HI	Pac	$31,749
USN	MAGAZINE, LUALUALEI	HI	Pac	$37,029
USMC	MARCORPS BASE, KANEOHE BAY	HI	Pac	$37,005
		Subtotal for Hawaii		$193,016
USN	TRAINING CENTER, GREAT LAKES	IL	South	$18,235
USN	HOSPITAL, GREAT LAKES	IL	South	$5,295
USN	NAVAL AIR STATION, GLENVIEW	IL	South	$6,973
USN	PUBLIC WORKS CENTER, GREAT LAKES	IL	South	$18,378
		Subtotal for Illinois		$48,881
USN	AVIONICS CENTER, INDIANAPOLIS	IN	South	$2,395
USN	WEAPONS SUPPORT CENTER, CRANE	IN	South	$156,147
		Subtotal for Indiana		$158,542
USN	SUPPORT ACTIVITY, NEW ORLEANS	LA	South	$14,652
USN	AIR STATION, BELLE CHASSE	LA	South	$10,163
USMC	HDQTRS 4TH MAR ARCRFT WNG, NEW ORLEANS	LA	South	$17
USMC	MARCORPS DIVISION HDQTRS, NEW ORLEANS	LA	South	$956
		Subtotal for Louisiana		$25,788
USN	WEAPONS INDUST RES PLANT, BEDFORD	MA	North	$635
		Subtotal for Massachussetts		$635

Table 7

Appendix F
Current Plant Value of Roads by State

Branch	Base	State	EFD	CPV (000)
USN	SCOL/ACADEMY, ANNAPOLIS	MD	Ches	$15,549
USN	MEDICAL CLINIC, ANNAPOLIS	MD	Ches	$431
USN	RESEARCH CENTER, BETHESDA	MD	Ches	$2,724
USN	NATNAVMEDCEN BETHESDA MD, BETHESDA	MD	Ches	$9,604
USN	ORDNANCE STATION, INDIAN HEAD	MD	Ches	$65,677
USN	AIR WARFARE CTR/AIRCRAFT, PATUXENT RIVER	MD	Ches	$113,789
USN	TRAINING CENTER, BAINBRIDGE	MD	Ches	$18,333
		Subtotal for Maryland		$226,107
USN	SECURITY GROUP ACTIVITY, WINTER HARBOR	ME	North	$1,830
USN	AIR STATION, BRUNSWICK	ME	North	$14,537
USN	COMMUNICATION UNIT, EAST MACHIAS	ME	North	$14,097
		Subtotal for Maine		$30,464
USN	INDUST RES ORDNANCE PLANT, MINNEAPOLIS	MN	South	$1,007
		Subtotal for Minnesotta		$1,007
USMC	MARCORPS SUPPORT ACTIVITY, KANSAS CITY	MO	South	$427
		Subtotal for Missouri		$427
USN	CONSTRUCTION BATTALN CTR, GULFPORT	MS	South	$17,443
USN	AIR STATION, MERIDIAN	MS	South	$11,504
USN	STATION, PASCAGOULA	MS	South	$4,101
		Subtotal for Mississippi		$33,048
USN	HOSPITAL, CAMP LEJEUNE	NC	South	$729
USMC	MARCORPS AIR STATION, CHERRY POINT	NC	South	$35,183
USMC	MARCORPS BASE, CAMP LEJEUNE	NC	South	$196,015
		Subtotal for North Carolina		$231,927
USN	SHIPYARD, PORTSMOUTH	NH	North	$15,655
		Subtotal for New Hampshire		$15,655
USN	WEAPONS STATION, COLTS NECK	NJ	North	$43,933
USN	AIR WARFARE CTR/AIRCRAFT, TRENTON	NJ	North	$1,453
USN	AIR WARFARE CTR/AIRCRAFT, LAKEHURST	NJ	North	$16,884
		Subtotal for New Jersey		$62,270
USN	AIR STATION, FALLON	NV	SWest	$16,370
		Subtotal for Nevada		$16,370
USN	WEAPONS INDUST RES PLANT, BETHPAGE	NY	North	$634
USN	WEAPONS INDUST RES PLANT, CALVERTON	NY	North	$2,986
USMC	MARCORPS DIST HEADQTRS, GARDEN CITY	NY	North	$11
		Subtotal for New York		$3,631
USN	INVENTORY CONTROL POINT, MECHANICSBURG	PA	North	$37,923
USN	AIR STATION, WILLOW GROVE	PA	North	$6,643
USN	AVIATION SUPPLY OFFICE, PHILADELPHIA	PA	North	$6,512
		Subtotal for Pennsylvania		$51,078

Table 7

Appendix F
Current Plant Value of Roads by State

Branch	Base	State	EFD	CPV (000)
USN	SCOL/WAR COLLEGE, NEWPORT	RI	North	$94
USN	EDUCATION & TRAINING CTR, NEWPORT	RI	North	$21,295
USN	'INDERWATER SYSTEMS CENTER, NEWPORT RHOD	RI	North	$4,365
USN	HOSPITAL, NEWPORT	RI	North	$1,702
	Subtotal for Rhode Island			$27,456
USN	HOSPITAL, BEAUFORT	SC	South	$1,215
USN	NAVAL WEAPONS STATION, GOOSE CREEK	SC	South	$46,981
USMC	MARCORPS RECRUIT DEPOT, PARRIS ISLAND	SC	South	$8,260
USMC	MARCORPS AIR STATION, BEAUFORT	SC	South	$13,812
	Subtotal for South Carolina			$70,268
USN	NAVAL SUPPORT ACTIVITY, MILLINGTON	TN	South	$22,873
USN	NAVSUPPACT MEMPHIS	TN	South	$6,847
USN	WEAPONS INDUST RES PLANT, BRISTOL	TN	South	$887
	Subtotal for Tennessee			$30,607
USN	AIR STATION, DALLAS	TX	South	$6,387
USN	AIR STATION, CORPUS CHRISTI	TX	South	$21,393
USN	HOSPITAL, CORPUS CHRISTI	TX	South	$165
USN	AIR STATION, KINGSVILLE	TX	South	$8,626
USN	STATION, INGLESIDE	TX	South	$5,054
USN	WEAPONS INDUST RES PLANT, MCGREGOR	TX	South	$4,864
	Subtotal for Texas			$46,489
USN	INDUST RES ORDNANCE PLANT, MAGNA	UT	SWest	$1,680
	Subtotal for Utah			$1,680
USN	SPACE COMMAND, DAHLGREN	VA	Ches	$1,290
USN	WEAPONS STATION, YORKTOWN	VA	Ches	$40,291
USN	SURFACE WEAPONS CENTER, DAHLGREN	VA	Ches	$32,255
USN	MEDICAL CLINIC, QUANTICO	VA	Ches	$775
USN	PETROLEUM OFFICE, ALEXANDRIA	VA	Ches	$3,938
USN	SECURITY GROUP ACTIVITY, CHESAPEAKE	VA	Ches	$2,649
USN	COMM AREA MASTER STATION, NORFOLK	VA	Ches	$44
USN	SHIPYARD, PORTSMOUTH	VA	Lant	$18,089
USN	HOSPITAL, PORTSMOUTH	VA	Lant	$2,637
USN	PUBLIC WORKS CENTER, NORFOLK	VA	Lant	$20,393
USN	AIR STATION, NORFOLK	VA	Lant	$25,904
USN	SUPPLY CENTER, NORFOLK	VA	Lant	$6,151
USN	FLT COMBAT TRNG CENTER, DAM NECK	VA	Lant	$7,826
USN	LANTFLT HQ SUP ACT, NORFOLK	VA	Lant	$1,384
USN	SUPPLY CENTER ANNEX, WILLIAMSBURG	VA	Lant	$2,064
USN	AIR STATION, VIRGINIA BEACH	VA	Lant	$15,334
USN	AMPHIBIOUS BASE, NORFOLK	VA	Lant	$23,596
USN	STATION, NORFOLK	VA	Lant	$6,298
USN	ARMED FORCES EXP TRNG ACT, WILLIAMSBURG	VA	Lant	$5,387
USMC	MARCORPS BASE, QUANTICO	VA	Ches	$134,171
USMC	HDQTRS BN HDQTRS MARCORPS, ARLINGTON	VA	Ches	$268
USMC	MARCORPS CAMP, NORFOLK	VA	Lant	$219
	Subtotal for Virginia			$350,963

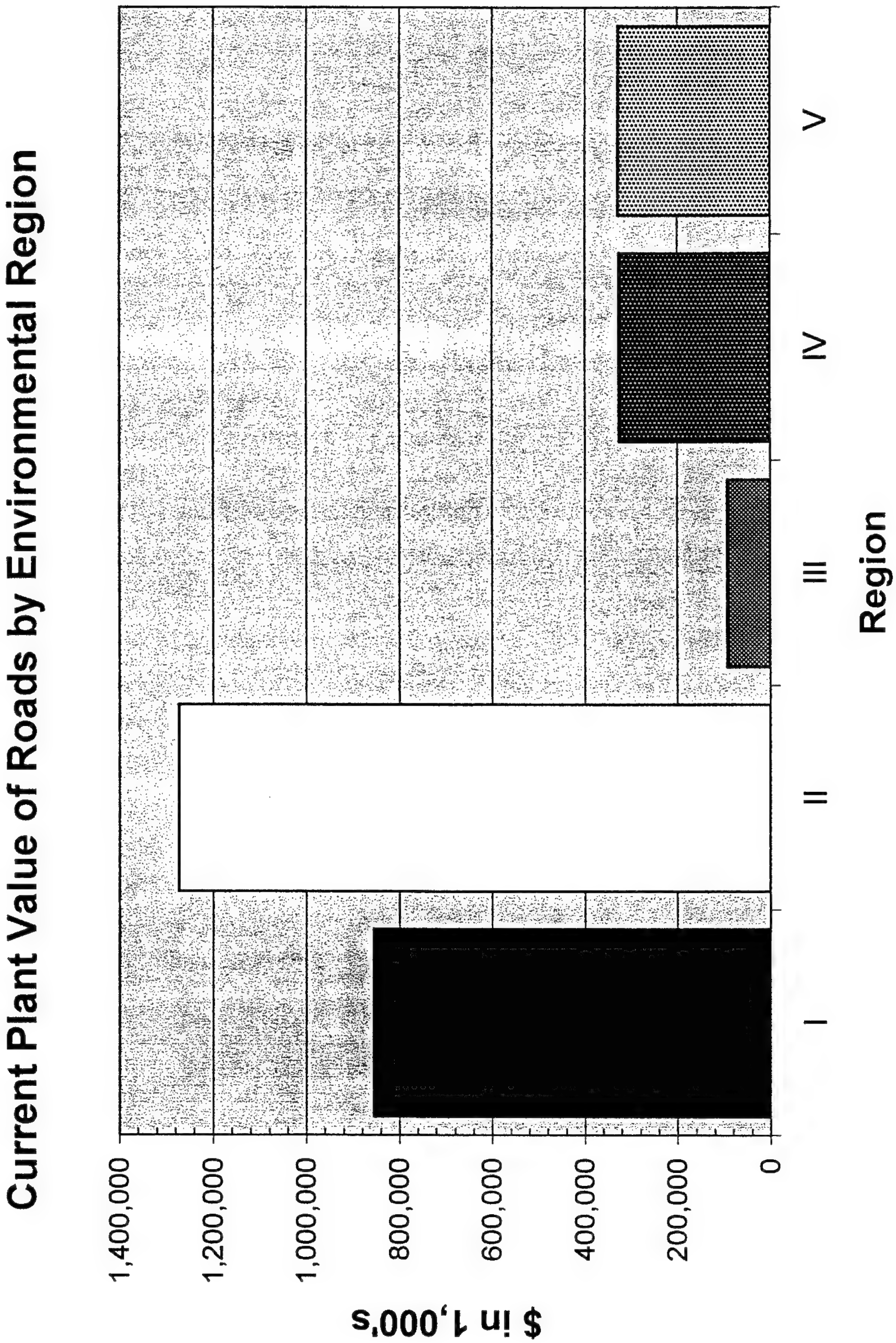
Table 7

Appendix F
Current Plant Value of Roads by State

Branch	Base	State	EFD	CPV (000)
USN	SHIPYARD, BREMERTON	WA	SWest	$15,650
USN	UNDERSEA WARFARE CEN DIV, KEYPORT	WA	SWest	$83,436
USN	SUPPLY CENTER, BREMERTON	WA	SWest	$4,228
USN	AIR STATION, OAK HARBOR	WA	SWest	$42,192
USN	STRATEGIC WEAPONS FAC, SILVERDALE	WA	SWest	$12,352
USN	SUBMARINE BASE, BANGOR	WA	SWest	$89,544
USN	STATION, EVERETT	WA	SWest	$5,178
USN	RADIO STATION, OSO	WA	SWest	$4,402
		Subtotal for Washington		$256,982
USN	SECURITY GROUP ACTIVITY, SUGAR GROVE	WV	North	$4,184
USN	INDUST RES ORDNANCE PLANT, ROCKET CENTER	WV	North	$6,382
		Subtotal for West Virginia		$10,566
USN	AIR FACILITY, WASHINGTON DC		Ches	$174
USN	DISTRICT COMMANDANT, WASHINGTON D C		Ches	$27,182
USN	LABORATORY, WASHINGTON DC		Ches	$14,793
USN	COMMUNICATION UNIT, DC		Ches	$723
USN	OBSERVATORY, WASHINGTON D C		Ches	$1,343
USN	PUBLIC WORKS CENTER, WASHINGTON DC		Ches	$2,972
USMC	MARCORPS BARRACKS, WASHINGTON D C		Ches	$57
		Subtotal for Washington D.C.		$47,244
		Total for all States		**$2,872,028**

Table 7

Appendix G



Current Plant Value of Roads by Environmental Region
$ in 1,000's
1,400,000
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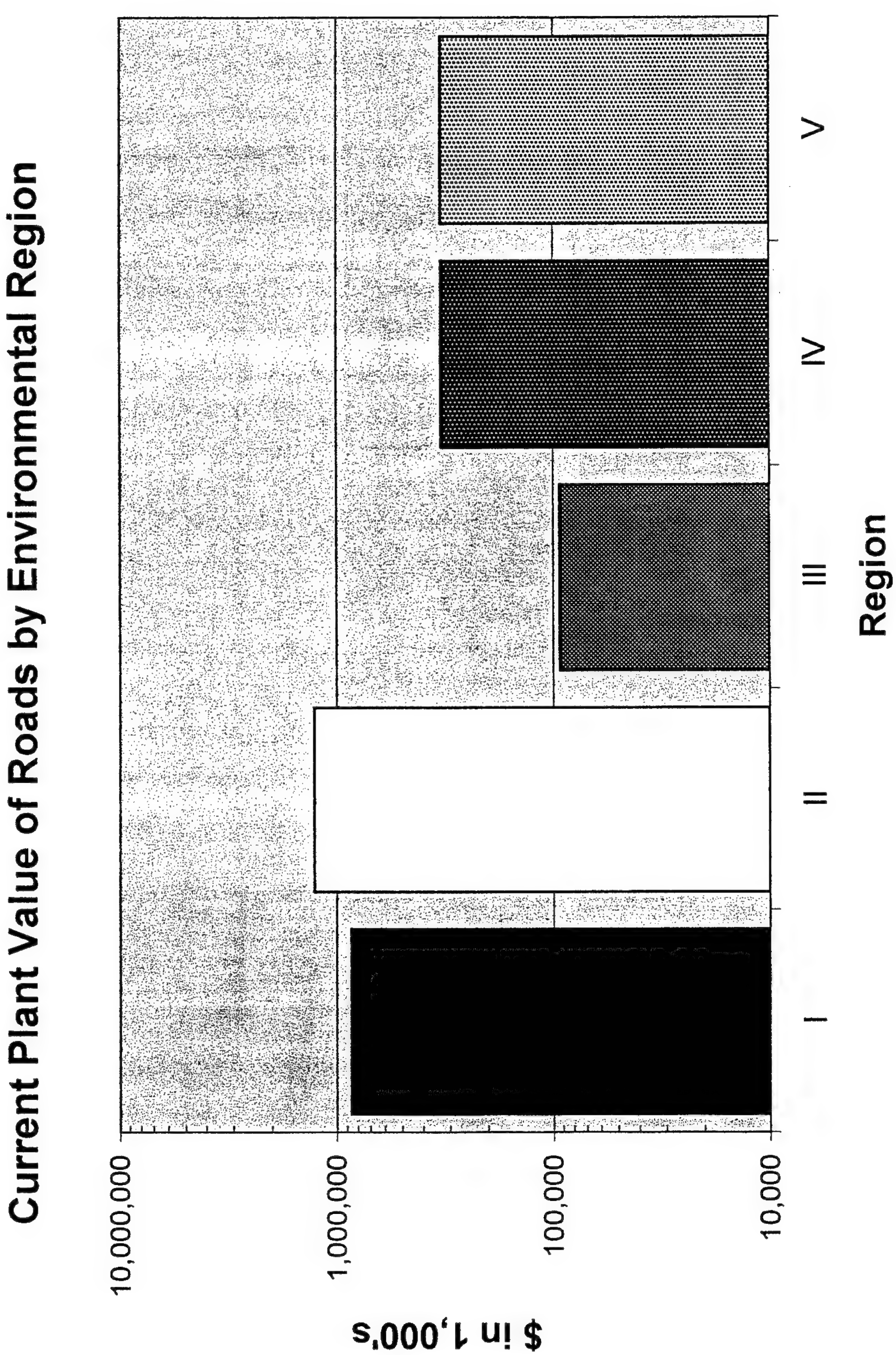
1,000,000
800,000
600,000
400,000
200,000
0
I
II
III
IV
V
Region

Appendix G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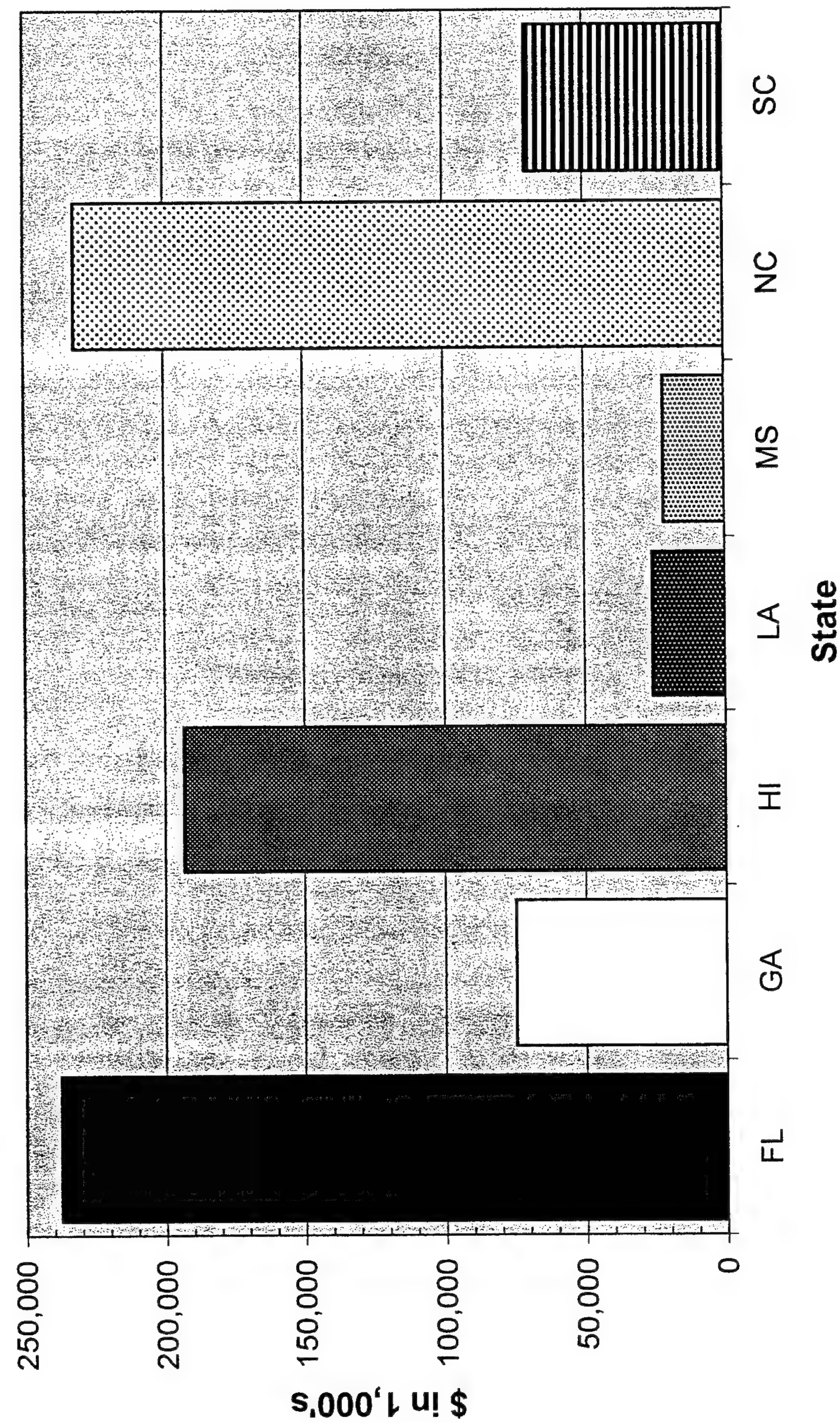
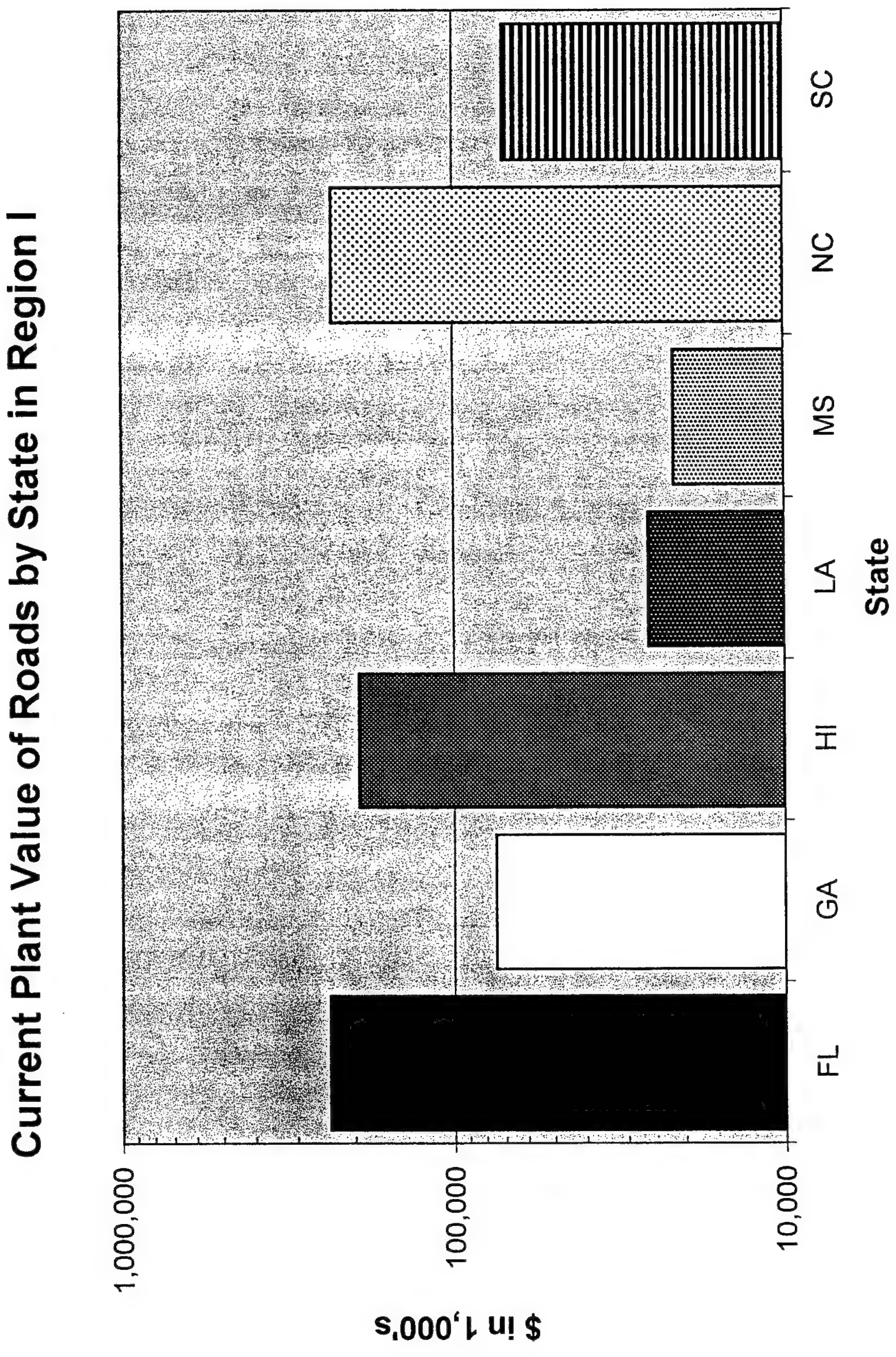
10,000,000
1,000,000
100,000
10,000
$ in 1,000's
I
II
III
IV
V
Region

Appendix G

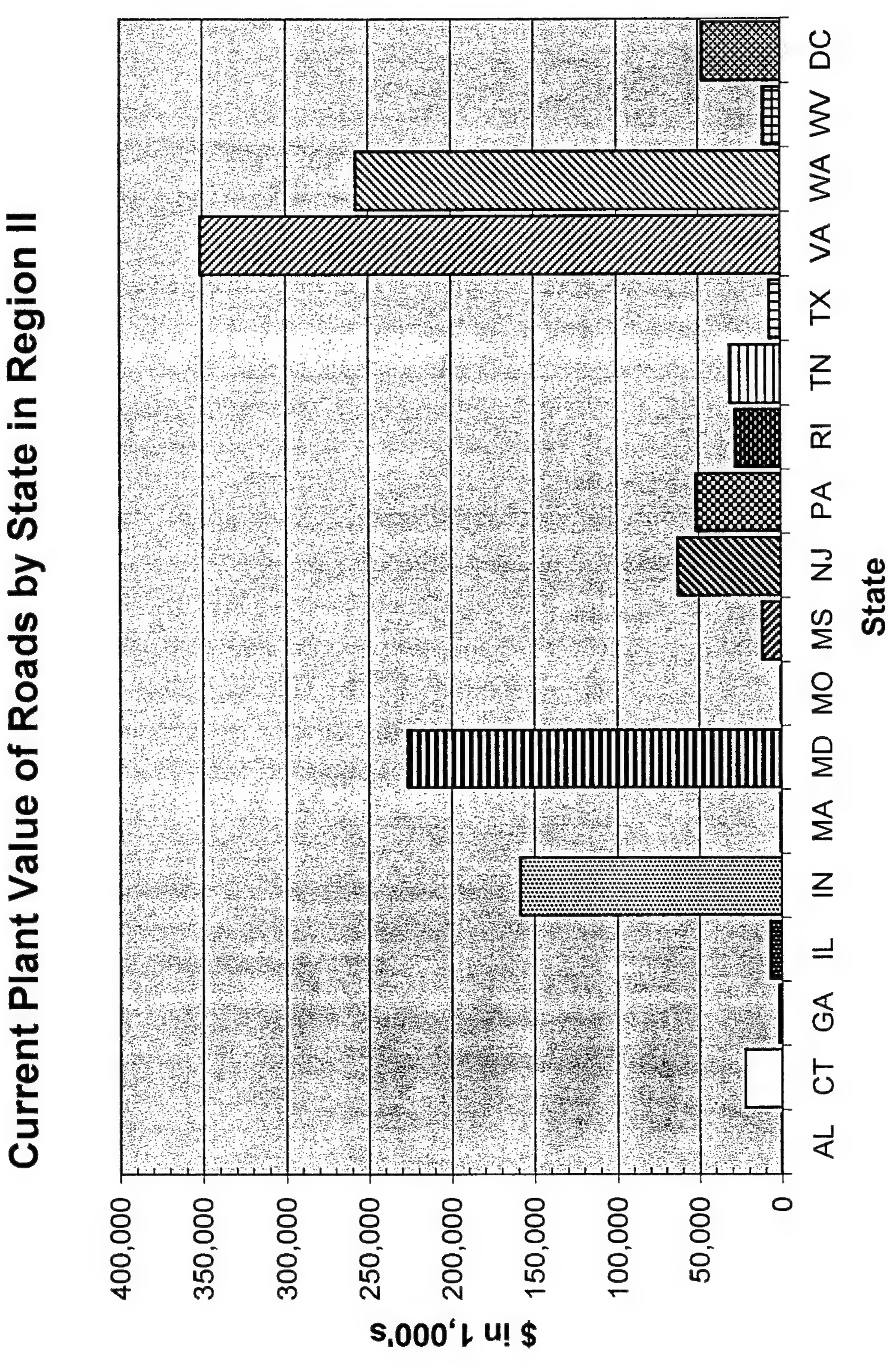
Current Plant Value of Roads by State in Region I



Appendix G


Current Plant Value of Roads by State in Region I
$ in 1,000's
1,000,000
100,000
10,000
FL
GA
HI
LA
MS
NC
SC
State

Appendix G


Current Plant Value of Roads by State in Region II
$ in 1,000's
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250,000
200,000
150,000
100,000
50,000
0
AL
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MS
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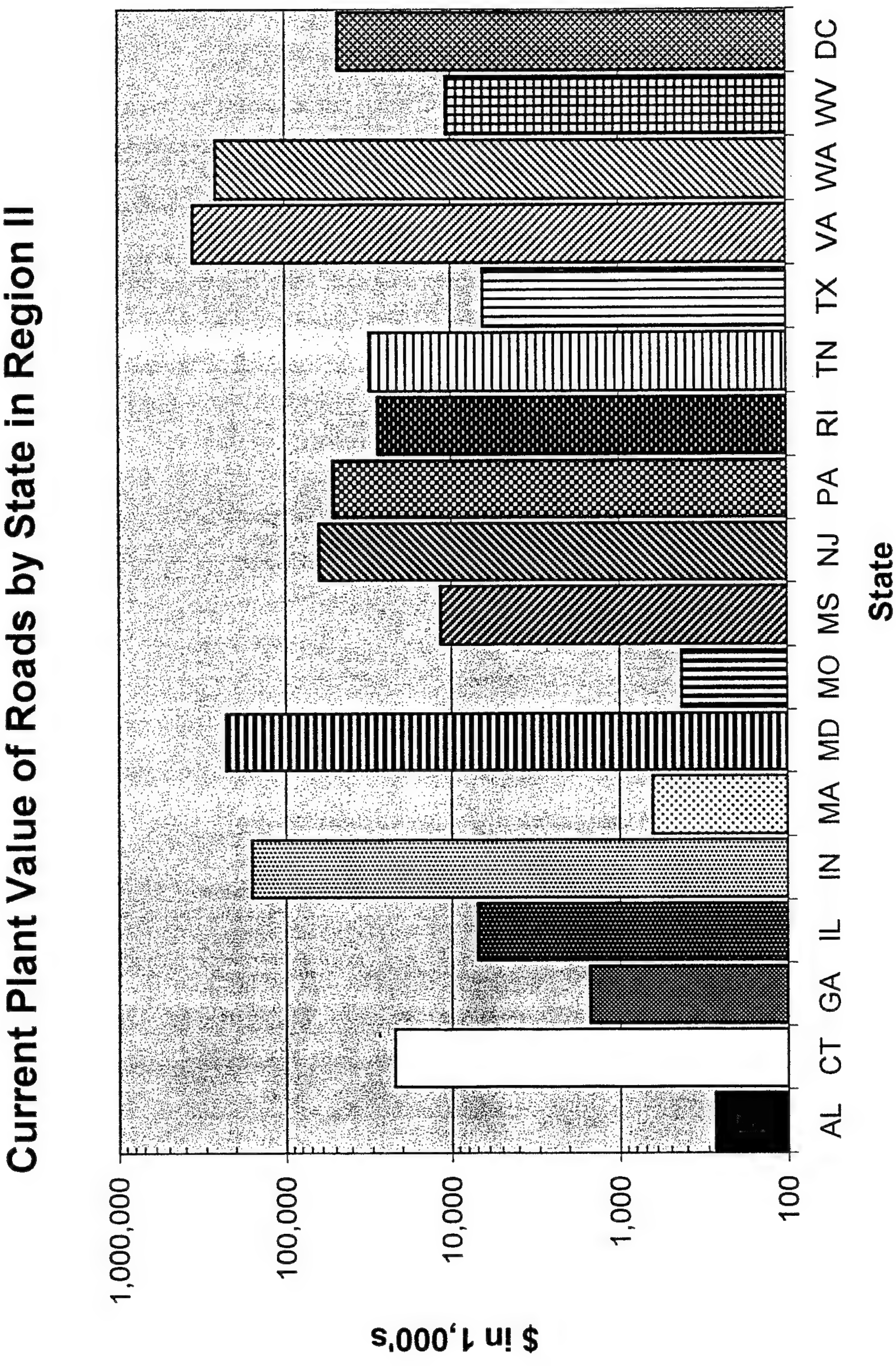
PA
RI
TN
TX
VA
WA
WV
DC
State

Appendix G


Current Plant Value of Roads by State in Region II
$ in 1,000's
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100,000
10,000
1,000
100
AL
CT
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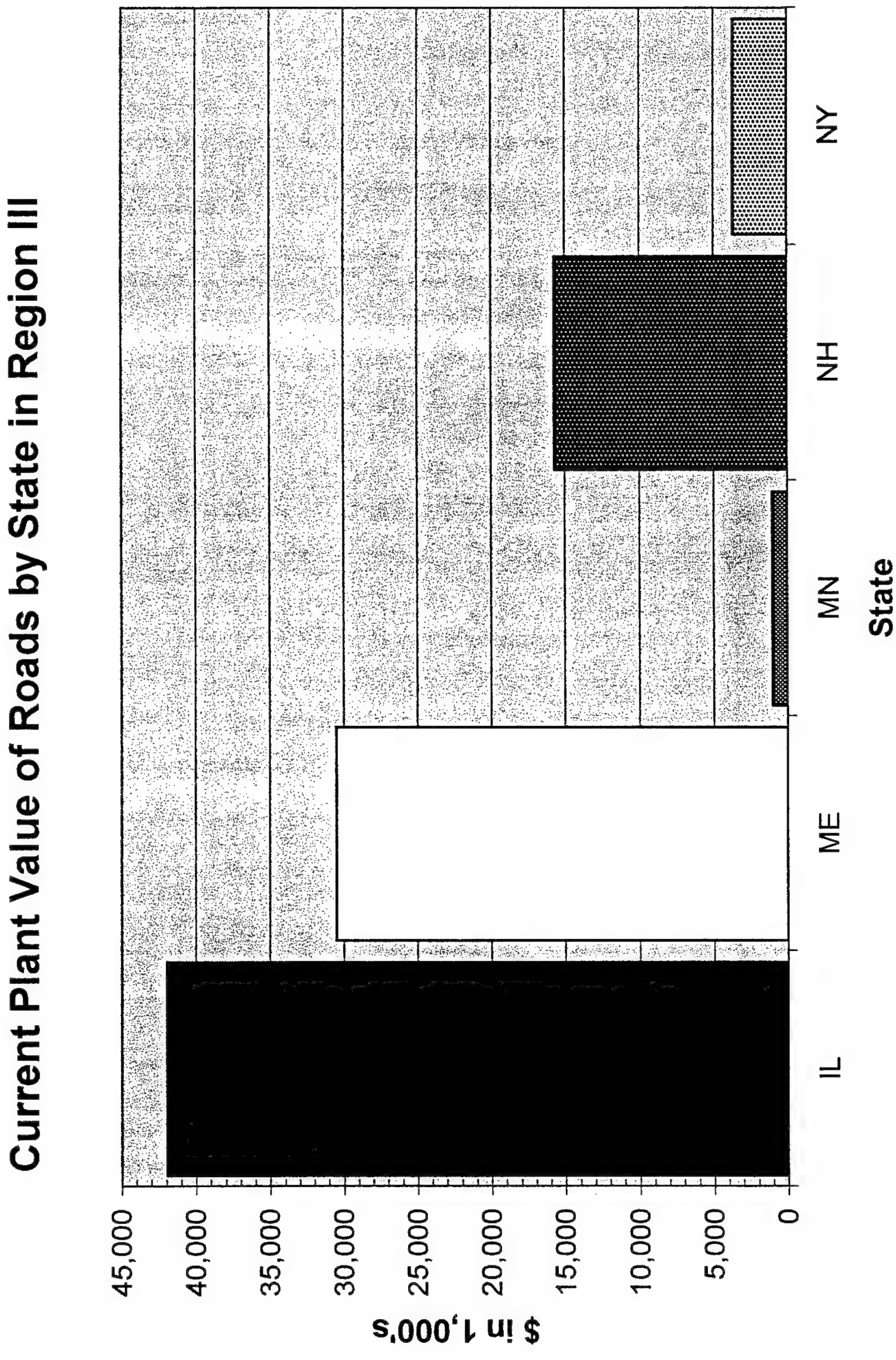
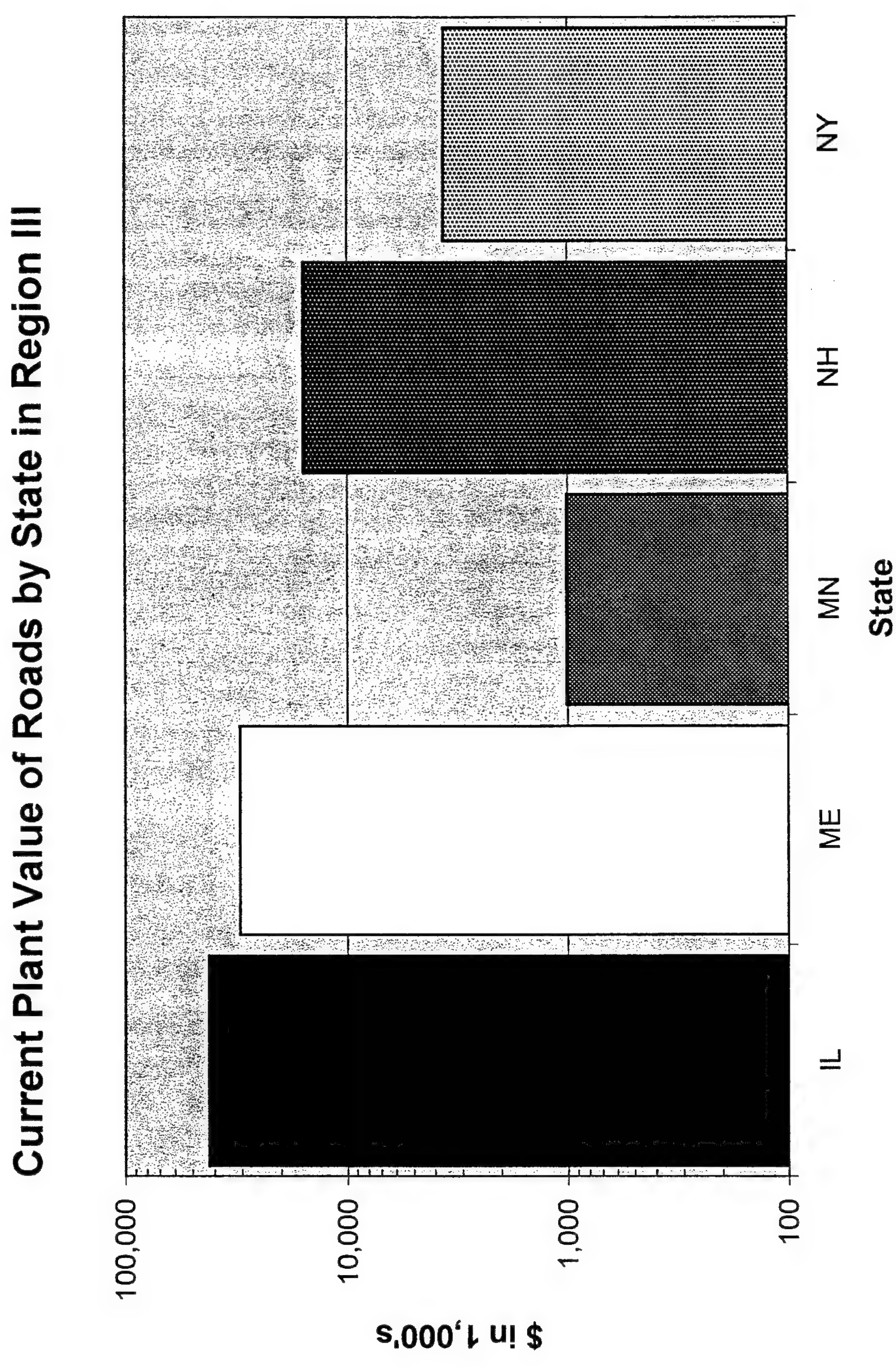
NJ
PA
RI
TN
TX
VA
WA
WV
DC
State

Appendix G

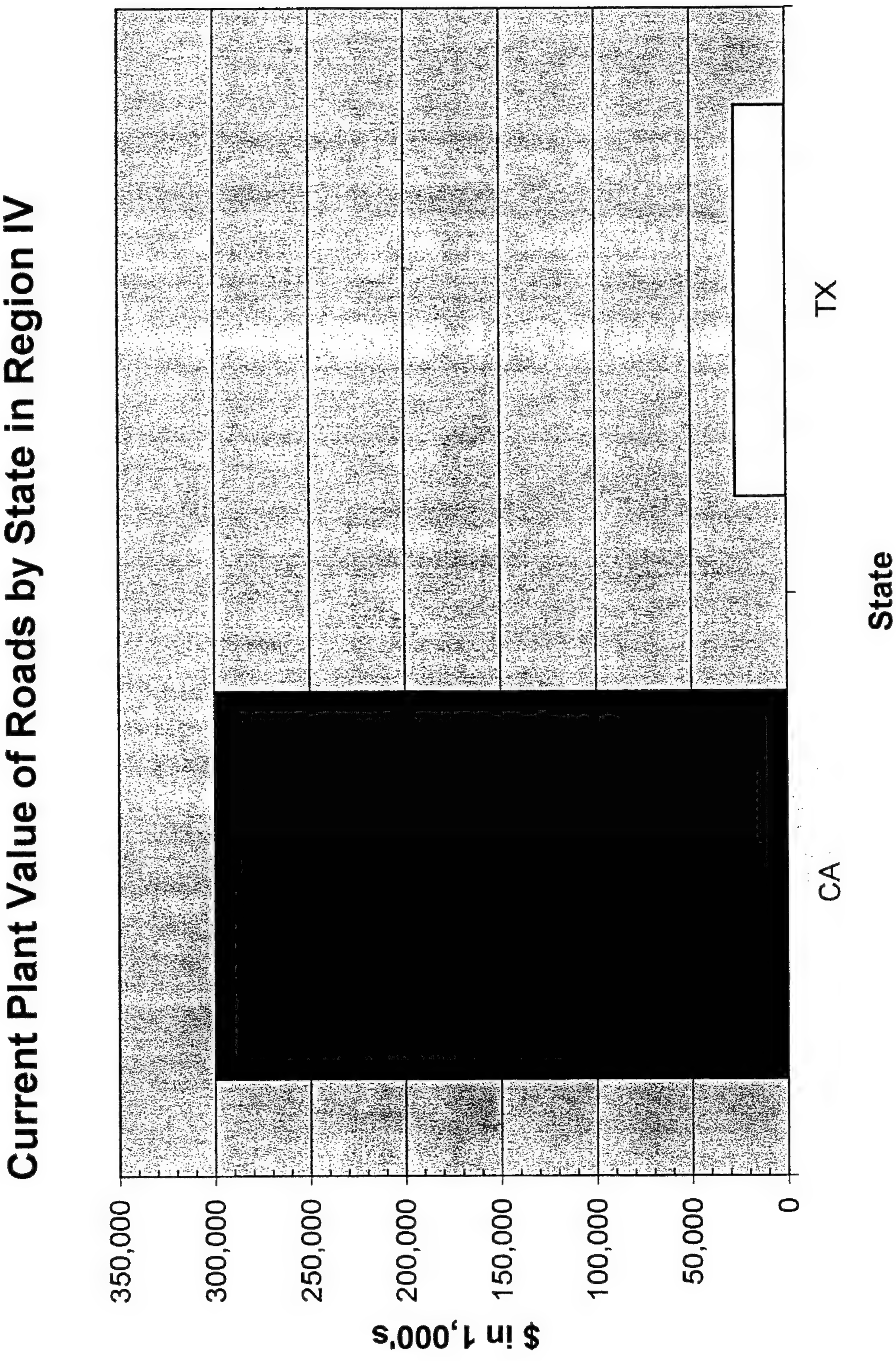

Current Plant Value of Roads by State in Region III
$ in 1,000's
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
IL
ME
MN
NH
NY
State

Appendix G

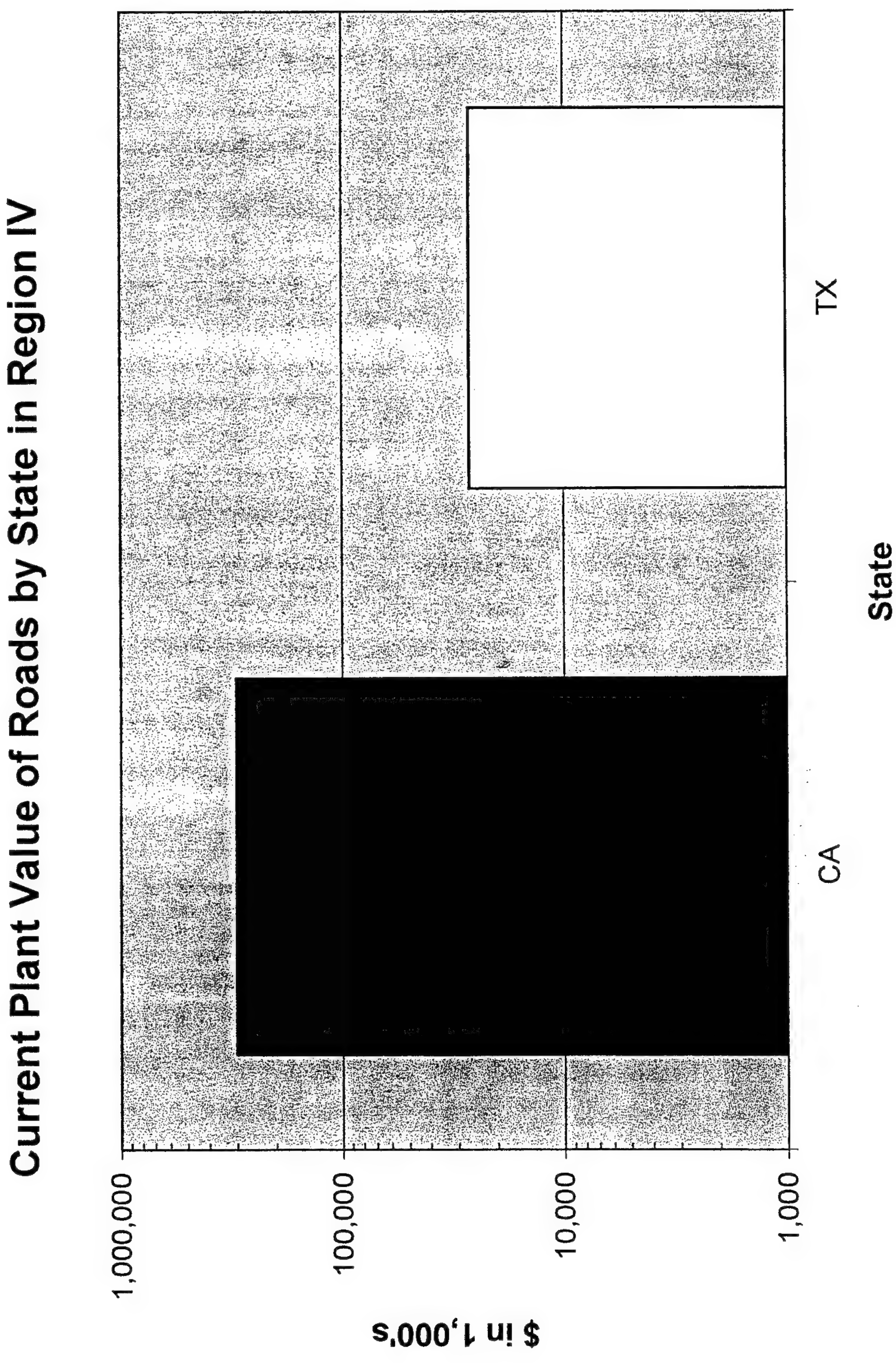


Current Plant Value of Roads by State in Region III
$ in 1,000's
100,000
10,000
1,000
100
IL
ME
MN
NH
NY
State

Appendix G

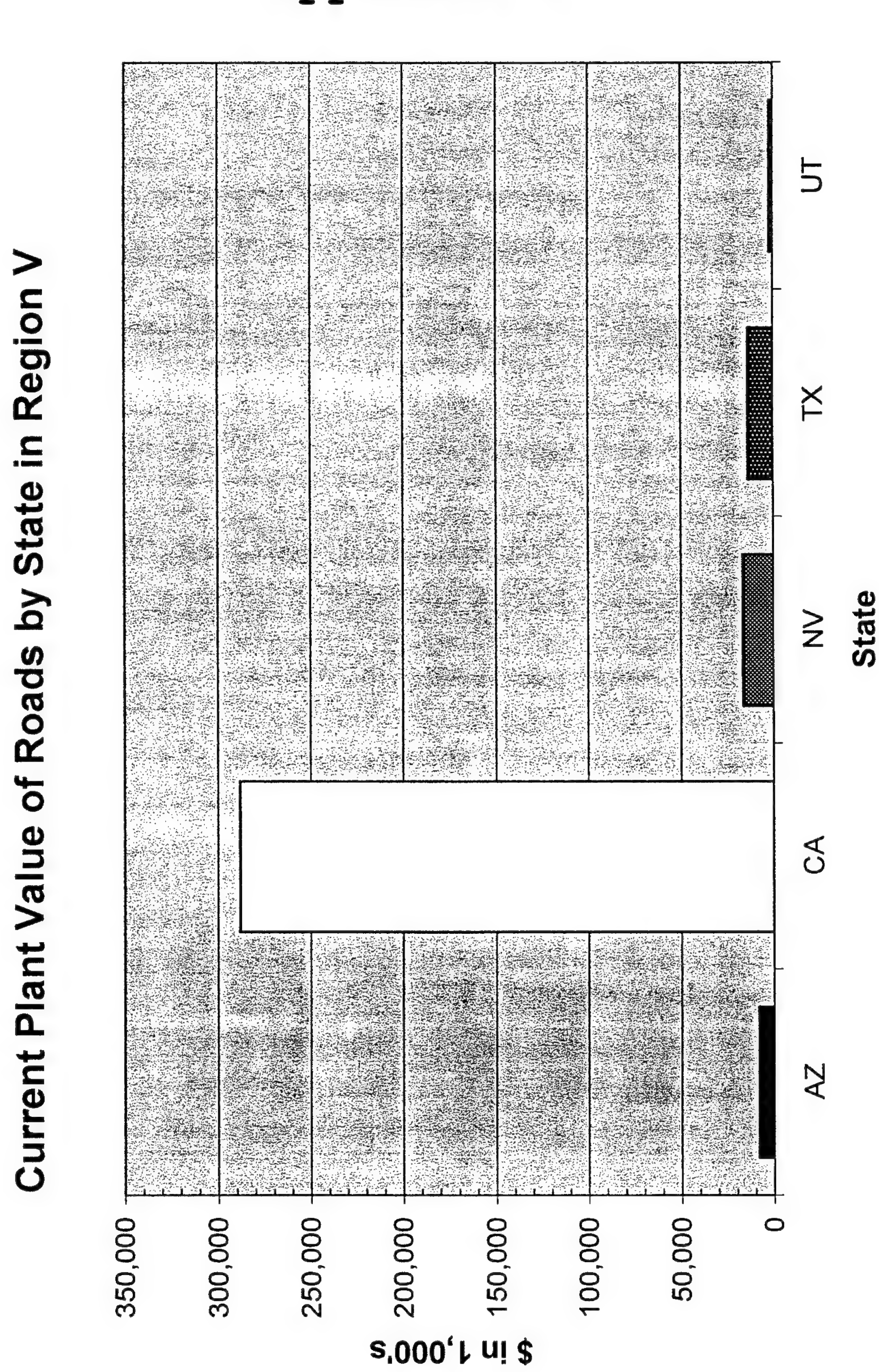

Current Plant Value of Roads by State in Region IV
$ in 1,000's
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
CA
TX
State

Appendix G

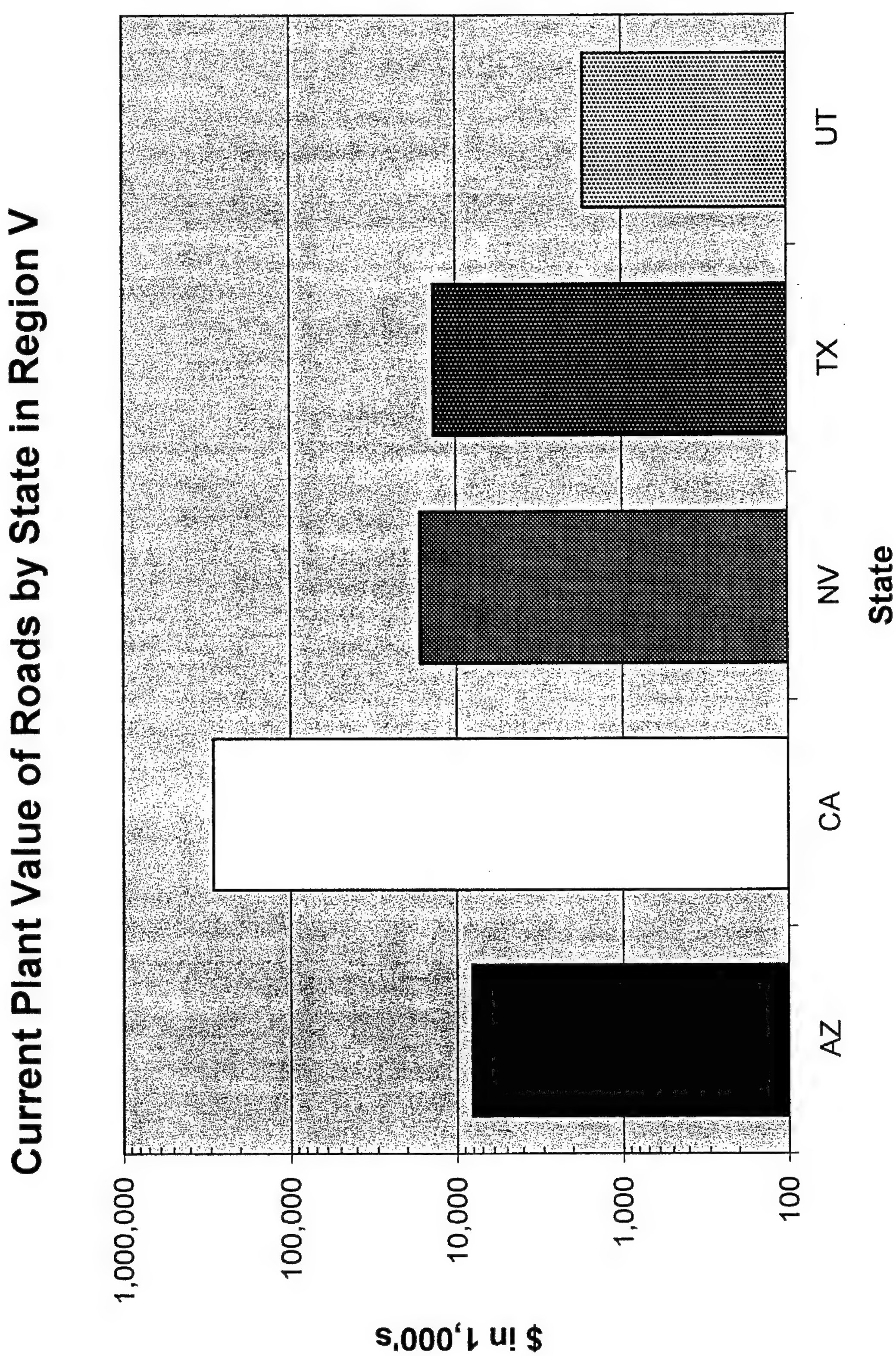


Current Plant Value of Roads by State in Region IV
1,000,000
100,000
10,000
1,000
$ in 1,000's
CA
TX
State

Appendix G


Current Plant Value of Roads by State in Region V
$ in 1,000's
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
AZ
CA
NV
TX
UT
State

Appendix G


Current Plant Value of Roads by State in Region V
$ in 1,000's
1,000,000
100,000
10,000
1,000
100
AZ
CA
NV
TX
UT
State

Appendix G
Current Plant Value of Roads
by Environmental Region and State

Region	Base	State	EFD	CPV (000)
1	AIR STATION, CECIL FIELD	FL	South	$34,007
1	AIR STATION, JACKSONVILLE	FL	South	$39,216
1	AIR STATION, KEY WEST	FL	South	$23,141
1	AIR STATION, MILTON	FL	South	$7,973
1	AIR STATION, PENSACOLA	FL	South	$99,565
1	COASTAL SYSTEMS CENTER, PANAMA CITY	FL	South	$4,474
1	COMMUNICATION UNIT, KEY WEST	FL	South	$308
1	HOSPITAL, PENSACOLA	FL	South	$205
1	MEDICAL CLINIC, KEY WEST	FL	South	$464
1	STATION, MAYPORT	FL	South	$5,723
1	SUPPLY CENTER, JACKSONVILLE	FL	South	$1,739
1	TECHNICAL TRAINING CENTER, PENSACOLA	FL	South	$2,916
1	TRAINING CENTER, ORLANDO	FL	South	$17,243
1	TRAINING SYSTEMS CENTER, ORLANDO	FL	South	$366
		Subtotal for Florida		$237,340
1	MARCORPS LOGISTICS BASE, ALBANY	GA	South	$10,526
1	SUBMARINE BASE, KINGS BAY	GA	South	$64,158
		Subtotal for Georgia		$74,684
1	AIR STATION, BARBERS POINT	HI	Pac	$39,986
1	COMPUTER & TELECOMMUNICAT, WAHIAWA	HI	Pac	$7,758
1	MAGAZINE, LUALUALEI	HI	Pac	$37,029
1	MARCORPS BASE, KANEOHE BAY	HI	Pac	$37,005
1	MISSILE RANGE FACILITY, KAUAI	HI	Pac	$5,657
1	PUBLIC WORKS CENTER, PEARL HARBOR	HI	Pac	$22,216
1	SHIPYARD/INTERMEDIATE FAC, PEARL HARBOR	HI	Pac	$5,091
1	STATION, PEARL HARBOR	HI	Pac	$31,749
1	SUPPLY CENTER, HONOLULU	HI	Pac	$6,525
		Subtotal for Hawaii		$193,016
1	AIR STATION, BELLE CHASSE	LA	South	$10,163
1	HDQTRS 4TH MAR ARCRFT WNG, NEW ORLEANS	LA	South	$17
1	MARCORPS DIVISION HDQTRS, NEW ORLEANS	LA	South	$956
1	SUPPORT ACTIVITY, NEW ORLEANS	LA	South	$14,652
		Subtotal for Louisiana		$25,788
1	CONSTRUCTION BATTALN CTR, GULFPORT	MS	South	$17,443
1	STATION, PASCAGOULA	MS	South	$4,101
		Subtotal for Mississippi		$21,544
1	HOSPITAL, CAMP LEJEUNE	NC	South	$729
1	MARCORPS AIR STATION, CHERRY POINT	NC	South	$35,183
1	MARCORPS BASE, CAMP LEJEUNE	NC	South	$196,015
		Subtotal for North Carolina		$231,927
1	HOSPITAL, BEAUFORT	SC	South	$1,215
1	MARCORPS AIR STATION, BEAUFORT	SC	South	$13,812
1	MARCORPS RECRUIT DEPOT, PARRIS ISLAND	SC	South	$8,260
1	NAVAL WEAPONS STATION, GOOSE CREEK	SC	South	$46,981
		Subtotal for South Carolina		$70,268
		Subtotal for Region I		**$854,567**

Table 8

Appendix G
Current Plant Value of Roads by Environmental Region and State

Region	Base	State	EFD	CPV (000)
2	LABORATORY, BARROW	AL	SWest	$271
		Subtotal for Alabama		$271
2	SUBMARINE BASE, GROTON	CT	North	$22,034
		Subtotal for Connecticut		$22,034
2	AIR STATION, MARIETTA	GA	South	$848
2	SCOL/SUPPLY CORPS, ATHENS	GA	South	$642
		Subtotal for Georgia		$1,490
2	NAVAL AIR STATION, GLENVIEW	IL	South	$6,973
		Subtotal for Illinois		$6,973
2	AVIONICS CENTER, INDIANAPOLIS	IN	South	$2,395
2	WEAPONS SUPPORT CENTER, CRANE	IN	South	$156,147
		Subtotal for Indiana		$158,542
2	WEAPONS INDUST RES PLANT, BEDFORD	MA	North	$635
		Subtotal for Massachussetts		$635
2	AIR WARFARE CTR/AIRCRAFT, PATUXENT RIVER	MD	Ches	$113,789
2	MEDICAL CLINIC, ANNAPOLIS	MD	Ches	$431
2	NATNAVMEDCEN BETHESDA MD, BETHESDA	MD	Ches	$9,604
2	ORDNANCE STATION, INDIAN HEAD	MD	Ches	$65,677
2	RESEARCH CENTER, BETHESDA	MD	Ches	$2,724
2	SCOL/ACADEMY, ANNAPOLIS	MD	Ches	$15,549
2	TRAINING CENTER, BAINBRIDGE	MD	Ches	$18,333
		Subtotal for Maryland		$226,107
2	MARCORPS SUPPORT ACTIVITY, KANSAS CITY	MO	South	$427
		Subtotal for Missouri		$427
2	AIR STATION, MERIDIAN	MS	South	$11,504
		Subtotal for Mississippi		$11,504
2	AIR WARFARE CTR/AIRCRAFT, LAKEHURST	NJ	North	$16,884
2	AIR WARFARE CTR/AIRCRAFT, TRENTON	NJ	North	$1,453
2	WEAPONS STATION, COLTS NECK	NJ	North	$43,933
		Subtotal for New Jersey		$62,270
2	AIR STATION, WILLOW GROVE	PA	North	$6,643
2	AVIATION SUPPLY OFFICE, PHILADELPHIA	PA	North	$6,512
2	INVENTORY CONTROL POINT, MECHANICSBURG	PA	North	$37,923
		Subtotal for Pennsylvania		$51,078
2	EDUCATION & TRAINING CTR, NEWPORT	RI	North	$21,295
2	HOSPITAL, NEWPORT	RI	North	$1,702
2	SCOL/WAR COLLEGE, NEWPORT	RI	North	$94
2	UNDERWATER SYSTEMS CENTER, NEWPORT	RI	North	$4,365
		Subtotal for Rhode Island		$27,456
2	NAVAL SUPPORT ACTIVITY, MILLINGTON	TN	South	$22,873
2	NAVSUPPACT MEMPHIS	TN	South	$6,847
2	WEAPONS INDUST RES PLANT, BRISTOL	TN	South	$887
		Subtotal for Tennessee		$30,607

Table 8

Appendix G
Current Plant Value of Roads
by Environmental Region and State

Region	Base	State	EFD	CPV (000)
2	AIR STATION, DALLAS	TX	South	$6,387
		Subtotal for Texas		$6,387
2	AIR STATION, NORFOLK	VA	Lant	$25,904
2	AIR STATION, VIRGINIA BEACH	VA	Lant	$15,334
2	AMPHIBIOUS BASE, NORFOLK	VA	Lant	$23,596
2	ARMED FORCES EXP TRNG ACT, WILLIAMSBURG	VA	Lant	$5,387
2	COMM AREA MASTER STATION, NORFOLK	VA	Ches	$44
2	FLT COMBAT TRNG CENTER, DAM NECK	VA	Lant	$7,826
2	HDQTRS BN HDQTRS MARCORPS, ARLINGTON	VA	Ches	$268
2	HOSPITAL, PORTSMOUTH	VA	Lant	$2,637
2	LANTFLT HQ SUP ACT, NORFOLK	VA	Lant	$1,384
2	MARCORPS BASE, QUANTICO	VA	Ches	$134,171
2	MARCORPS CAMP, NORFOLK	VA	Lant	$219
2	MEDICAL CLINIC, QUANTICO	VA	Ches	$775
2	PETROLEUM OFFICE, ALEXANDRIA	VA	Ches	$3,938
2	PUBLIC WORKS CENTER, NORFOLK	VA	Lant	$20,393
2	SECURITY GROUP ACTIVITY, CHESAPEAKE	VA	Ches	$2,649
2	SHIPYARD, PORTSMOUTH	VA	Lant	$18,089
2	SPACE COMMAND, DAHLGREN	VA	Ches	$1,290
2	STATION, NORFOLK	VA	Lant	$6,298
2	SUPPLY CENTER ANNEX, WILLIAMSBURG	VA	Lant	$2,064
2	SUPPLY CENTER, NORFOLK	VA	Lant	$6,151
2	SURFACE WEAPONS CENTER, DAHLGREN	VA	Ches	$32,255
2	WEAPONS STATION, YORKTOWN	VA	Ches	$40,291
		Subtotal for Virginia		$350,963
2	AIR STATION, OAK HARBOR	WA	SWest	$42,192
2	RADIO STATION, OSO	WA	SWest	$4,402
2	SHIPYARD, BREMERTON	WA	SWest	$15,650
2	STATION, EVERETT	WA	SWest	$5,178
2	STRATEGIC WEAPONS FAC, SILVERDALE	WA	SWest	$12,352
2	SUBMARINE BASE, BANGOR	WA	SWest	$89,544
2	SUPPLY CENTER, BREMERTON	WA	SWest	$4,228
2	UNDERSEA WARFARE CEN DIV, KEYPORT	WA	SWest	$83,436
		Subtotal for Washington		$256,982
2	INDUST RES ORDNANCE PLANT, ROCKET CENTER	WV	North	$6,382
2	SECURITY GROUP ACTIVITY, SUGAR GROVE	WV	North	$4,184
		Subtotal for West Virginia		$10,566
2	AIR FACILITY, WASHINGTON DC		Ches	$174
2	COMMUNICATION UNIT, DC		Ches	$723
2	DISTRICT COMMANDANT, WASHINGTON D C		Ches	$27,182
2	LABORATORY, WASHINGTON DC		Ches	$14,793
2	MARCORPS BARRACKS, WASHINGTON D C		Ches	$57
2	OBSERVATORY, WASHINGTON D C		Ches	$1,343
2	PUBLIC WORKS CENTER, WASHINGTON DC		Ches	$2,972
		Subtotal for Washington D.C.		$47,244
		Subtotal for Region II		**$1,271,536**

Table 8

Appendix G
Current Plant Value of Roads by Environmental Region and State

Region	Base	State	EFD	CPV (000)
3	HOSPITAL, GREAT LAKES	IL	South	$5,295
3	PUBLIC WORKS CENTER, GREAT LAKES	IL	South	$18,378
3	TRAINING CENTER, GREAT LAKES	IL	South	$18,235
		Subtotal for Illinois		$41,908
3	AIR STATION, BRUNSWICK	ME	North	$14,537
3	COMMUNICATION UNIT, EAST MACHIAS	ME	North	$14,097
3	SECURITY GROUP ACTIVITY, WINTER HARBOR	ME	North	$1,830
		Subtotal for Maine		$30,464
3	INDUST RES ORDNANCE PLANT, MINNEAPOLIS	MN	South	$1,007
		Subtotal for Mir		$1,007
3	SHIPYARD, PORTSMOUTH	NH	North	$15,655
		Subtotal for New Hampshire		$15,655
3	MARCORPS DIST HEADQTRS, GARDEN CITY	NY	North	$11
3	WEAPONS INDUST RES PLANT, BETHPAGE	NY	North	$634
3	WEAPONS INDUST RES PLANT, CALVERTON	NY	North	$2,986
		Subtotal for New York		$3,631
		Subtotal for Region III		**$92,665**
4	AIR STATION, SAN DIEGO	CA	SWest	$28,507
4	BASE, SAN DIEGO	CA	SWest	$15,448
4	COMPUTER & TELCOMMTN. SAT, SAN DIEGO	CA	SWest	$10,093
4	CONSTRUCT BATTALION CTR, PORT HUENEME	CA	SWest	$5,508
4	DBOF, PT MUGU	CA	SWest	$18,613
4	FACILITY, FERNDALE	CA	SWest	$779
4	FLT ANTI-SUB WARF TRN CTR, SAN DIEGO	CA	SWest	$777
4	HOSPITAL, CAMP PENDLETON	CA	SWest	$438
4	HOSPITAL, SAN DIEGO	CA	SWest	$2,034
4	INDUST RES ORDNANCE PLANT, SUNNYVALE	CA	SWest	$3,703
4	MARCORPS AIR STATION, CAMP PENDLETON	CA	SWest	$424
4	MARCORPS AIR STATION, IRVINE	CA	SWest	$24,074
4	MARCORPS AIR STATION, SAN DIEGO	CA	SWest	$21,456
4	MARCORPS BASE, CAMP PENDLETON	CA	SWest	$50,715
4	MARCORPS RECRUIT DEPOT, SAN DIEGO	CA	SWest	$9,600
4	NAVAL WARFARE ASSESSMENT, CORONA	CA	SWest	$538
4	SCOL/POSTGRADUATE, MONTEREY	CA	SWest	$10,502
4	SECURITY GROUP ACTIVITY, SKAGGS ISLAND	CA	SWest	$4,103
4	STATION, SAN DIEGO	CA	SWest	$11,609
4	SUBMARINE BASE, SAN DIEGO	CA	SWest	$5,100
4	SUPPLY CENTER, SAN DIEGO	CA	SWest	$2,974
4	WARFARE SYSTEM CENTER, SAN DIEGO	CA	SWest	$7,847
4	WEAPONS SUPPORT FACILITY, SEAL BEACH	CA	SWest	$64,190
		Subtotal for California		$299,032
4	AIR STATION, CORPUS CHRISTI	TX	South	$21,393
4	HOSPITAL, CORPUS CHRISTI	TX	South	$165
4	STATION, INGLESIDE	TX	South	$5,054
		Subtotal for Texas		$26,612
		Subtotal for Region IV		**$325,644**

Table 8

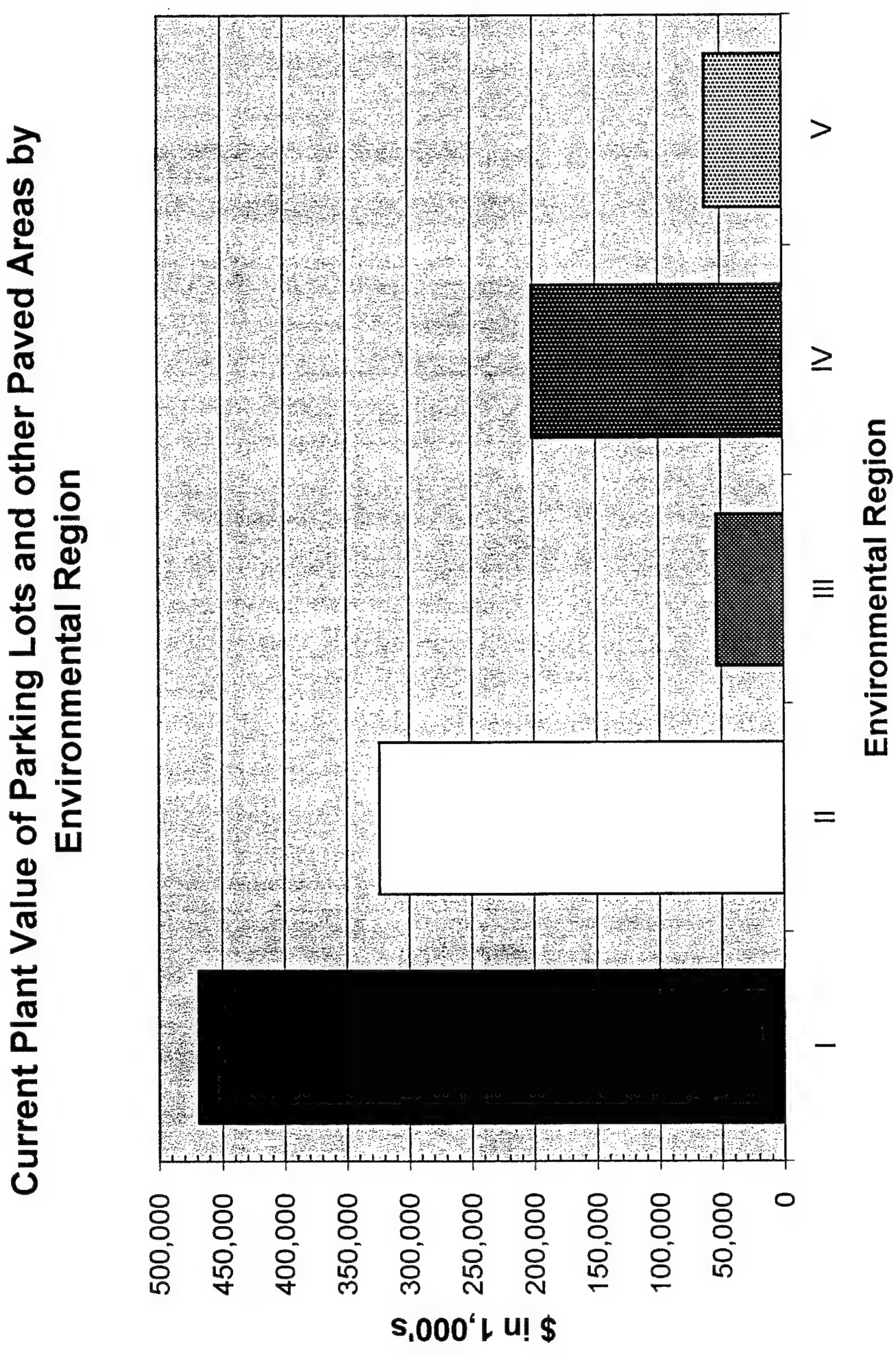
Appendix G
Current Plant Value of Roads
by Environmental Region and State

Region	Base	State	EFD	CPV (000)
5	MARCORPS AIR STATION, YUMA	AZ	SWest	$8,072
		Subtotal for Arizona		$8,072
5	AIR FACILITY, EL CENTRO	CA	SWest	$14,306
5	AIR STATION, LEMOORE	CA	SWest	$23,623
5	AIR WEAPONS STATION, CHINA LAKE	CA	SWest	$207,435
5	MARCORPS AIR STATION, TUSTIN	CA	SWest	$6,364
5	MARCORPS BASE, TWENTYNINE PALMS	CA	SWest	$24,570
5	MARCORPS LOGISTICS BASE, BARSTOW	CA	SWest	$11,706
		Subtotal for California		$288,004
5	AIR STATION, FALLON	NV	SWest	$16,370
		Subtotal for Nevada		$16,370
5	AIR STATION, KINGSVILLE	TX	South	$8,626
5	WEAPONS INDUST RES PLANT, MCGREGOR	TX	South	$4,864
		Subtotal for Texas		$13,490
5	INDUST RES ORDNANCE PLANT, MAGNA	UT	SWest	$1,680
		Subtotal for Utah		$1,680
		Subtotal for Rgion V		**$327,616**
		Total for all Regions		**$2,872,028**

NOTE: The Navy does not have any facilities within Region VI

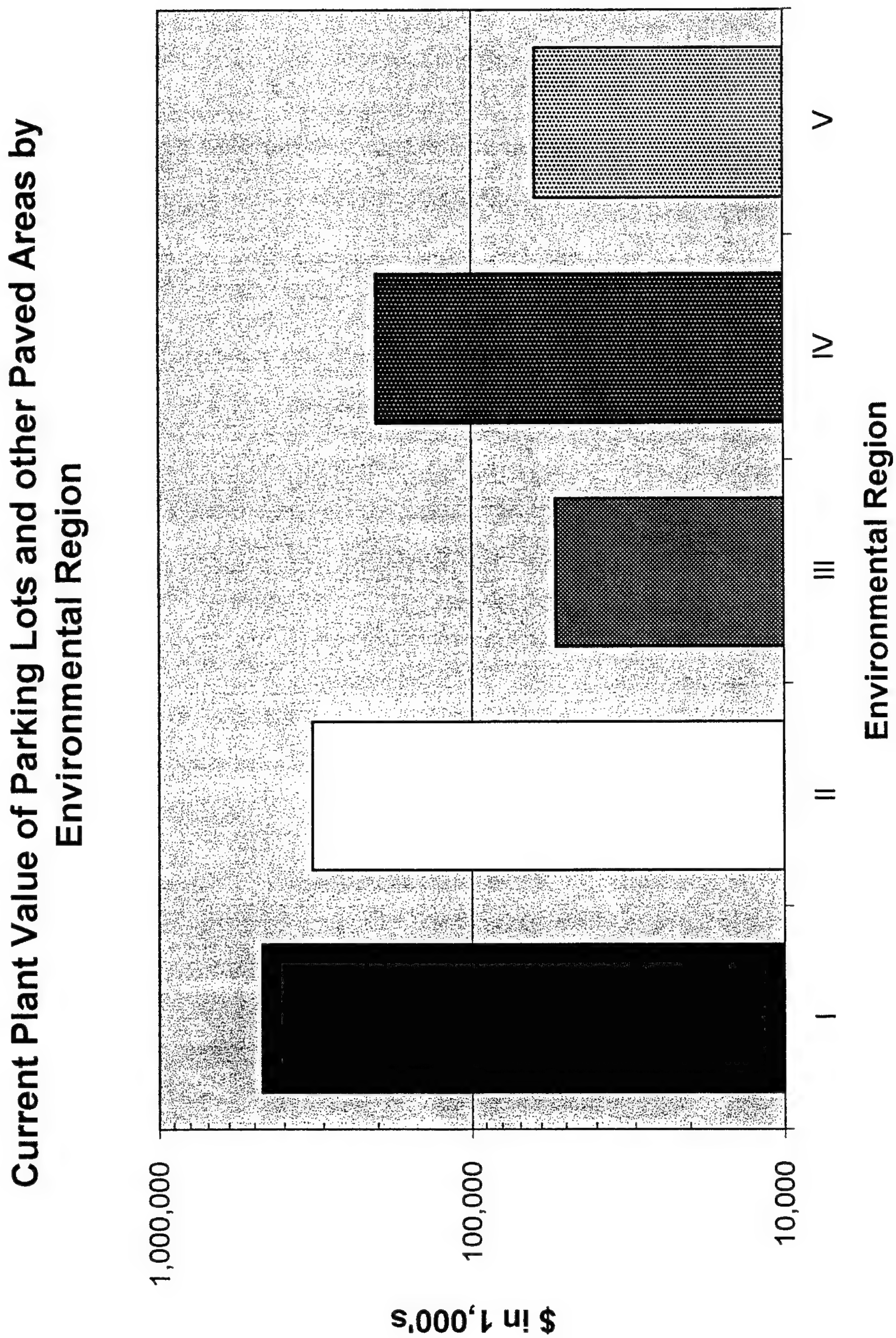
Table 8

Appendix H



Current Plant Value of Parking Lots and other Paved Areas by Environmental Region
$ in 1,000's
500,000
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
I
II
III
IV
V
Environmental Region

Appendix H



Current Plant Value of Parking Lots and other Paved Areas by Environmental Region
$ in 1,000's
1,000,000
100,000
10,000
I
II
III
IV
V
Environmental Region

Appendix H
Current Plant Value of Parking Lots and other Paved Areas by Environmental Region

Region	Base	State	EFD	CPV
1	AIR STATION, CECIL FIELD	FL	South	$18,329
1	AIR STATION, JACKSONVILLE	FL	South	$24,623
1	AIR STATION, KEY WEST	FL	South	$16,837
1	AIR STATION, MILTON	FL	South	$2,730
1	AIR STATION, PENSACOLA	FL	South	$19,519
1	COASTAL SYSTEMS CENTER, PANAMA CITY	FL	South	$5,181
1	HOSPITAL, JACKSONVILLE	FL	South	$3,001
1	HOSPITAL, PENSACOLA	FL	South	$621
1	MEDICAL CLINIC, KEY WEST	FL	South	$224
1	PUBLIC WORKS CENTER, PENSACOLA	FL	South	$4,332
1	STATION, MAYPORT	FL	South	$18,515
1	SUPPLY CENTER, JACKSONVILLE	FL	South	$23
1	TECHNICAL TRAINING CENTER, PENSACOLA	FL	South	$1,555
1	TRAINING CENTER, ORLANDO	FL	South	$7,514
1	TRAINING SYSTEMS CENTER, ORLANDO	FL	South	$591
1	MARCORPS LOGISTICS BASE, ALBANY	GA	South	$7,330
1	STRAT WEAPONS FAC LANT, KINGS BAY	GA	South	$8,195
1	SUBMARINE BASE, KINGS BAY	GA	South	$27,631
1	TRIDENT TRAINING FACILITY, KINGS BAY	GA	South	$252
1	MARCORPS BASE, KANEOHE BAY	HI	Pac	$22,566
1	AIR STATION, BARBERS POINT	HI	Pac	$3,791
1	COMPUTER & TELECOMMUNICAT, WAHIAWA	HI	Pac	$2,259
1	ELEC ENGR ACT, PEARL HARBOR	HI	Pac	$430
1	ENVIRON & PREV MED UNIT, PEARL HARBOR	HI	Pac	$47
1	INACTIVE SHIP MAINT FAC, PEARL HARBOR	HI	Pac	$67
1	MAGAZINE, LUALUALEI	HI	Pac	$4,206
1	MEDICAL CLINIC, PEARL HARBOR	HI	Pac	$441
1	METEOR AND OCEAN CMD DET, PEARL HARBOR	HI	Pac	$115
1	MISSILE RANGE FACILITY, KAUAI	HI	Pac	$1,507
1	PUBLIC WORKS CENTER, PEARL HARBOR	HI	Pac	$8,004
1	SHIPYARD/INTERMEDIATE FAC, PEARL HARBOR	HI	Pac	$3,247
1	STATION, PEARL HARBOR	HI	Pac	$26,400
1	SUPPLY CENTER, HONOLULU	HI	Pac	$1,193
1	AIR STATION, BELLE CHASSE	LA	South	$4,631
1	HDQTRS 4TH MAR ARCRFT WNG, NEW ORLEANS	LA	South	$169
1	MARCORPS DIVISION HDQTRS, NEW ORLEANS	LA	South	$4,326
1	SUPPORT ACTIVITY, NEW ORLEANS	LA	South	$3,291
1	CONSTRUCTION BATTALN CTR, GULFPORT	MS	South	$15,404
1	STATION, PASCAGOULA	MS	South	$3,156
1	SUPVR SHIPBLDG CONV/REPR, PASCAGOULA	MS	South	$168
1	HOSPITAL, CAMP LEJEUNE	NC	South	$1,047
1	MARCORPS AIR STATION, CHERRY POINT	NC	South	$23,946
1	MARCORPS BASE, CAMP LEJEUNE	NC	South	$138,718
1	CONSOLIDATED BRIG, CHARLESTON	SC	South	$470
1	CONSTRUCTION FORCE, FORT JACKSON	SC	South	$281
1	HOSPITAL, BEAUFORT	SC	South	$666
1	HOSPITAL, CHARLESTON	SC	South	$696

Table 9

Appendix H
Current Plant Value of Parking Lots and other Paved Areas by Environmental Region

Region	Base	State	EFD	CPV
1	MARCORPS AIR STATION, BEAUFORT	SC	South	$8,298
1	MARCORPS RECRUIT DEPOT, PARRIS ISLAND	SC	South	$3,493
1	NAVAL WEAPONS STATION, GOOSE CREEK	SC	South	$16,158
1	SPACE AND COMMUNICATIONS, CHARLESTON	SC	South	$1,980
		Subtotal for Region I		$468,174
2	SUBMARINE BASE, GROTON	CT	North	$7,440
2	WEAPONS INDUST RES PLANT, BLOOMFIELD	CT	North	$415
2	AIR STATION, MARIETTA	GA	South	$1,585
2	SCOL/SUPPLY CORPS, ATHENS	GA	South	$449
2	NAVAL AIR STATION, GLENVIEW	IL	South	$960
2	AVIONICS CENTER, INDIANAPOLIS	IN	South	$2,089
2	WEAPONS SUPPORT CENTER, CRANE	IN	South	$3,097
2	NAVAL MOBILE CONST BN, BARKSDALE AFB	LA	South	$25
2	INDUST RES ORDNANCE PLANT, PITTSFIELD	MA	North	$1,421
2	WEAPONS INDUST RES PLANT, BEDFORD	MA	North	$185
2	AIR WARFARE CTR/AIRCRAFT, PATUXENT RIVER	MD	Ches	$17,946
2	MEDICAL CLINIC, ANNAPOLIS	MD	Ches	$237
2	NATNAVMEDCEN BETHESDA MD, BETHESDA	MD	Ches	$2,393
2	ORDNANCE STATION, INDIAN HEAD	MD	Ches	$4,422
2	RESEARCH CENTER, BETHESDA	MD	Ches	$3,912
2	SCOL/ACADEMY, ANNAPOLIS	MD	Ches	$12,746
2	TRAINING CENTER, BAINBRIDGE	MD	Ches	$7,695
2	MARCORPS SUPPORT ACTIVITY, KANSAS CITY	MO	South	$73
2	AIR STATION, MERIDIAN	MS	South	$3,714
2	AIR WARFARE CTR/AIRCRAFT, LAKEHURST	NJ	North	$4,967
2	AIR WARFARE CTR/AIRCRAFT, TRENTON	NJ	North	$1,958
2	TECH REP AND AEGIS CSEDS, MOORESTOWN	NJ	North	$38
2	WEAPONS STATION, COLTS NECK	NJ	North	$3,007
2	FACILITY, CHARLESTON	OR	SWest	$100
2	AIR STATION, WILLOW GROVE	PA	North	$1,664
2	AVIATION SUPPLY OFFICE, PHILADELPHIA	PA	North	$601
2	INVENTORY CONTROL POINT, MECHANICSBURG	PA	North	$1,674
2	EDUCATION & TRAINING CTR, NEWPORT	RI	North	$5,293
2	HOSPITAL, NEWPORT	RI	North	$111
2	SCOL/WAR COLLEGE, NEWPORT	RI	North	$143
2	UNDERWATER SYSTEMS CENTER, NEWPORT	RI	North	$5,901
2	MED CLINIC, MILLINGTON	TN	South	$199
2	NAVAL SUPPORT ACTIVITY, MILLINGTON	TN	South	$22,626
2	WEAPONS INDUST RES PLANT, BRISTOL	TN	South	$2,627
2	AIR STATION, DALLAS	TX	South	$11,804
2	WEAPONS INDUST RES PLANT, DALLAS	TX	South	$12,276
2	HDQTRS BN HDQTRS MARCORPS, ARLINGTON	VA	Ches	$441
2	MARCORPS BASE, QUANTICO	VA	Ches	$9,037
2	MEDICAL CLINIC, QUANTICO	VA	Ches	$161
2	PETROLEUM OFFICE, ALEXANDRIA	VA	Ches	$1,101
2	SECURITY GROUP ACTIVITY, CHESAPEAKE	VA	Ches	$3,077

Table 9

Appendix H
Current Plant Value of Parking Lots and other Paved Areas by Environmental Region

Region	Base	State	EFD	CPV
2	SPACE COMMAND, DAHLGREN	VA	Ches	$42
2	SURFACE WEAPONS CENTER, DAHLGREN	VA	Ches	$10,570
2	WEAPONS STATION, YORKTOWN	VA	Ches	$4,782
2	AIR STATION, NORFOLK	VA	Lant	$10,107
2	AIR STATION, VIRGINIA BEACH	VA	Lant	$8,687
2	AMPHIBIOUS BASE, NORFOLK	VA	Lant	$10,988
2	COMBAT SYSTEMS CMD, WALLOPS ISLAND	VA	Lant	$2,108
2	COMM AREA MASTER STATION, NORFOLK	VA	Lant	$622
2	ENVIRON & PREV MED UNIT, NORFOLK	VA	Lant	$30
2	FLT COMBAT TRNG CENTER, DAM NECK	VA	Lant	$2,843
2	FLT TRAINING CENTER, NORFOLK	VA	Lant	$1,228
2	HOSPITAL, PORTSMOUTH	VA	Lant	$3,904
2	LANTFLT HQ SUP ACT, NORFOLK	VA	Lant	$3,506
2	OPER TEST & EVAL FORCE, NORFOLK	VA	Lant	$143
2	PUBLIC WORKS CENTER, NORFOLK	VA	Lant	$2,783
2	SHIPYARD, PORTSMOUTH	VA	Lant	$5,722
2	SHORE ACTIVITY, NORFOLK	VA	Lant	$378
2	STATION, NORFOLK	VA	Lant	$10,650
2	SUPPLY CENTER ANNEX, WILLIAMSBURG	VA	Lant	$275
2	SUPPLY CENTER, NORFOLK	VA	Lant	$877
2	MARCORPS CAMP, NORFOLK	VA	Lant	$396
2	AIR STATION, OAK HARBOR	WA	SWest	$25,745
2	HOSPITAL, BREMERTON	WA	SWest	$764
2	RADIO STATION, OSO	WA	SWest	$245
2	SHIPYARD, BREMERTON	WA	SWest	$6,104
2	STATION, EVERETT	WA	SWest	$10,632
2	STRATEGIC WEAPONS FAC, SILVERDALE	WA	SWest	$5,409
2	SUBMARINE BASE, BANGOR	WA	SWest	$10,583
2	SUPPLY CENTER, BREMERTON	WA	SWest	$367
2	TRIDENT REFIT FACILITY, BANGOR	WA	SWest	$1,300
2	UNDERSEA WARFARE CEN DIV, KEYPORT	WA	SWest	$2,643
2	INDUST RES ORDNANCE PLANT, ROCKET CENTER	WV	North	$2,469
2	SECURITY GROUP ACTIVITY, SUGAR GROVE	WV	North	$56
2	AIR FACILITY, WASHINGTON DC		Ches	$2,072
2	COMMUNICATION UNIT, DC		Ches	$175
2	DISTRICT COMMANDANT, WASHINGTON D C		Ches	$9,223
2	LABORATORY, WASHINGTON DC		Ches	$4,808
2	MARCORPS BARRACKS, WASHINGTON D C		Ches	$61
2	OBSERVATORY, WASHINGTON D C		Ches	$318
2	PUBLIC WORKS CENTER, WASHINGTON DC		Ches	$115
		Subtotal for Region II		$323,340
3	FACILITY, ADAK	AK	SWest	$4
3	HOSPITAL, GREAT LAKES	IL	South	$1,290
3	PUBLIC WORKS CENTER, GREAT LAKES	IL	South	$17,400
3	TRAINING CENTER, GREAT LAKES	IL	South	$18,290
3	AIR STATION, BRUNSWICK	ME	North	$4,866

Table 9

Appendix H
Current Plant Value of Parking Lots and other Paved Areas by Environmental Region

Region	Base	State	EFD	CPV
3	ASTRONAUTICS GROUP DET, PROSPECT HARBOR	ME	North	$22
3	COMMUNICATION UNIT, EAST MACHIAS	ME	North	$621
3	SECURITY GROUP ACTIVITY, WINTER HARBOR	ME	North	$648
3	ASTRONAUTICS GROUP DET, ROSEMOUNT	MN	South	$12
3	INDUST RES ORDNANCE PLANT, MINNEAPOLIS	MN	South	$551
3	INDUST RES ORDNANCE PLANT, ST PAUL	MN	South	$92
3	MEDICAL CLINIC, PORTSMOUTH	NH	North	$108
3	SHIPYARD, PORTSMOUTH	NH	North	$4,759
3	INDUST RES ORDNANCE PLANT, ROCHESTER	NY	North	$174
3	MARCORPS DIST HEADQTRS, GARDEN CITY	NY	North	$320
3	WEAPONS INDUST RES PLANT, BETHPAGE	NY	North	$3,646
3	WEAPONS INDUST RES PLANT, CALVERTON	NY	North	$691
		Subtotal for Region III		$53,494
4	AIR STATION, SAN DIEGO	CA	SWest	$12,762
4	BASE, SAN DIEGO	CA	SWest	$2,429
4	COMPUTER & TELCOMMTN. SAT, SAN DIEGO	CA	SWest	$2,310
4	CONSTRUCT BATTALION CTR, PORT HUENEME	CA	SWest	$9,012
4	DBOF, PT MUGU	CA	SWest	$21,384
4	FACILITY, FERNDALE	CA	SWest	$1,118
4	FLT ANTI-SUB WARF TRN CTR, SAN DIEGO	CA	SWest	$447
4	FLT COMBAT TRNG CENTER, SAN DIEGO	CA	SWest	$684
4	HOSPITAL, CAMP PENDLETON	CA	SWest	$592
4	HOSPITAL, SAN DIEGO	CA	SWest	$637
4	INDUST RES ORDNANCE PLANT, SUNNYVALE	CA	SWest	$1,755
4	MARCORPS AIR STATION, CAMP PENDLETON	CA	SWest	$1,225
4	MARCORPS AIR STATION, IRVINE	CA	SWest	$11,905
4	MARCORPS AIR STATION, SAN DIEGO	CA	SWest	$9,509
4	MARCORPS BASE, CAMP PENDLETON	CA	SWest	$63,935
4	MARCORPS RECRUIT DEPOT, SAN DIEGO	CA	SWest	$5,430
4	NAVAL WARFARE ASSESSMENT, CORONA	CA	SWest	$725
4	PUBLIC WORKS CENTER, SAN DIEGO	CA	SWest	$1,367
4	SCOL/POSTGRADUATE, MONTEREY	CA	SWest	$2,535
4	SECURITY GROUP ACTIVITY, SKAGGS ISLAND	CA	SWest	$260
4	STATION, SAN DIEGO	CA	SWest	$4,289
4	SUBMARINE BASE, SAN DIEGO	CA	SWest	$3,416
4	SUPPLY CENTER, SAN DIEGO	CA	SWest	$311
4	SURFACE WARFARE CENTER, PORT HUENEME	CA	SWest	$147
4	WARFARE SYSTEM CENTER, SAN DIEGO	CA	SWest	$8,450
4	WEAPONS SUPPORT FACILITY, SEAL BEACH	CA	SWest	$13,424
4	AIR STATION, CORPUS CHRISTI	TX	South	$15,573
4	HOSPITAL, CORPUS CHRISTI	TX	South	$363
4	STATION, INGLESIDE	TX	South	$4,324
		Subtotal for Region IV		$200,318

Table 9

Appendix H
Current Plant Value of Parking Lots and other Paved Areas by Environmental Region

Region	Base	State	EFD	CPV
5	MARCORPS AIR STATION, YUMA	AZ	SWest	$5,945
5	AIR FACILITY, EL CENTRO	CA	SWest	$475
5	AIR STATION, LEMOORE	CA	SWest	$6,857
5	AIR WEAPONS STATION, CHINA LAKE	CA	SWest	$14,703
5	MARCORPS AIR STATION, TUSTIN	CA	SWest	$4,273
5	MARCORPS BASE, TWENTYNINE PALMS	CA	SWest	$13,526
5	MARCORPS LOGISTICS BASE, BARSTOW	CA	SWest	$3,360
5	AIR STATION, FALLON	NV	SWest	$6,011
5	AIR STATION, KINGSVILLE	TX	South	$6,216
5	WEAPONS INDUST RES PLANT, MCGREGOR	TX	South	$317
5	INDUST RES ORDNANCE PLANT, MAGNA	UT	SWest	$572
		Subtotal for Region V		$62,255
		Total for all Regions		**$1,107,581**

Table 9

Appendix I

Listing of Construction Offices by Environmental Region

#	Region	Office	State	EFD
1	1	ROICC Camp Lejeune	NC	LANT
2	1	ROICC Cherry Point	NC	LANT
3	1	PACNAVFACENGCOM CONTR Pearl Harbor	HI	PAC
4	1	ROICC MID-PACIFIC Pearl Harbor	HI	PAC
5	1	SOUTHDIV CONT OFC Jacksonville	FL	SOUTH
6	1	SOUTHDIV CONT OFC Key West	FL	SOUTH
7	1	SOUTHDIV CONT OFC Panama City	FL	SOUTH
8	1	SOUTHDIV CONT OFC Pensacola	FL	SOUTH
9	1	NAVSUBASE Kings Bay	GA	SOUTH
10	1	SOUTHDIV CONT OFC Albany	GA	SOUTH
11	1	SOUTHDIV CONT OFC Kings Bay	GA	SOUTH
12	1	SOUTHDIV CONT OFC New Orleans	LA	SOUTH
13	1	SOUTHDIV CONT OFC Biloxi	MS	SOUTH
14	1	SOUTHDIV C O Beaufort Port Royal	SC	SOUTH
15	1	SOUTHDIV CONT OFC NAVWPNSTA Charleston	SC	SOUTH
1	4	SOUTHDIV CONT OFC Corpus Christi	TX	SOUTH
2	4	SOUTHDIV CONT OFC Ingleside	TX	SOUTH
3	4	SOUTHWESTDIV CONT OFC Camp Pendleton	CA	SWEST
4	4	SOUTHWESTDIV CONT OFC Los Angelos	CA	SWEST
5	4	SOUTHWESTDIV CONT OFC MCAS El Toro	CA	SWEST
6	4	SOUTHWESTNAVFACENGCOM San Diego	CA	SWEST
7	4	WESTDIV CONT OFC Concord	CA	SWEST
8	4	WESTDIV CONT OFC NAVPGSCOL Monterey	CA	SWEST
9	4	WESTDIV CONT OFC PT Mugu	CA	SWEST
1	5	SOUTHDIV CONT OFC Kingsville	TX	SOUTH
2	5	SOUTHWESTDIV CONT OFC MCAS Yuma	AZ	SWEST
3	5	EFA WEST CONT OFC NAS Lemoore	CA	SWEST
4	5	SOUTHWESTDIV CONT OFC 29 Palms	CA	SWEST
5	5	SOUTHWESTDIV CONT OFC MCLB Barstow	CA	SWEST
6	5	SOUTHWESTDIV CONT OFC NAF El Centro	CA	SWEST
7	5	WESTDIV CONT OFC NAVWPNCEN China Lake	CA	SWEST
8	5	WESTDIV CONT OFC Travis Fairfield	CA	SWEST
9	5	EFA WEST CONT OFC NAS Fallon	NV	SWEST

Appendix I

Listing of Construction Offices by Environmental Region

#	Region	Office	State	EFD
1	2	EFA CHES C O NAS Patuxent River	MD	CHES
2	2	EFA CHES CONT OFC Annapolis	MD	CHES
3	2	EFA CHES CONT OFC Indian Head	MD	CHES
4	2	EFA CHES CONT OFC Thurmont	MD	CHES
5	2	EFA CHES ROICC Bethesda	MD	CHES
6	2	EFA CHES ROICC NDW	MD	CHES
7	2	EFA CHES ROICC WNY BRAC	MD	CHES
8	2	EFA CHES CONT OFC Dahlgren	VA	CHES
9	2	EFA CHES CONT OFC Quantico	VA	CHES
10	2	OICC NAVHOSP Portsmouth	VA	LANT
11	2	ROICC Little Creek	VA	LANT
12	2	ROICC NAVSHIPYD Norfolk	VA	LANT
13	2	ROICC Norfolk	VA	LANT
14	2	ROICC Oceana	VA	LANT
15	2	ROICC Yorktown	VA	LANT
16	2	NORTHDIV CONT OFC New London	CT	NORTH
17	2	NORTHDIV CONT OFC Earle Colts Neck	NJ	NORTH
18	2	NORTHDIV CONT OFC Lakehurst	NJ	NORTH
19	2	NORTHDIV CONT OFC East PA Area	PA	NORTH
20	2	NORTHDIV CONT OFC Mechanicsburg	PA	NORTH
21	2	NORTHDIV CONT OFC Philadelphia	PA	NORTH
22	2	NORTHDIV CONT OFC Newport	RI	NORTH
23	2	ENGFLDACT MIDWEST CONT OFC Crane	IN	SOUTH
24	2	SOUTHDIV CONT OFC Barksdale	LA	SOUTH
25	2	SOUTHDIV CONT OFC Meridian	MS	SOUTH
26	2	SOUTHDIV CONT OFC Memphis	TN	SOUTH
27	2	SOUTHDIV CONT OFC Fort Worth	TX	SOUTH
28	2	ENGFLDACT NW C O NAS Whidbey Island	WA	SWEST
29	2	ENGFLDACT NW C O NAVSTA Everett	WA	SWEST
30	2	ENGFLDACT NW Poulsbo	WA	SWEST
1	3	NORTHDIV CONT OFC Brunswick	ME	NORTH
2	3	NORTHDIV CONT OFC Portsmouth	NH	NORTH
3	3	ENGFLDACT MW Great Lakes	IL	SOUTH